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A Management System Approach to Operational Excellence in the Energy Industry

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Thesis:

A Management System Approach to Operational Excellence in the Energy Industry

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Abstract

A Management System Approach to Operational Excellence in the Energy Industry

Chevron, an international integrated energy corporation has installed the Operational Excellence Management System (OEMS) to achieve world-class performance in environmental, health, safety, efficiency, and reliability concerns. This management system is fully described in this research. It shares many attributes with the international standard for environmental management systems known as ISO 14001, although the OEMS is designed to include concerns in safety, health efficiency and reliability, in addition to environmental issues. This research investigates the comparability of the OEMS to the international standard. Through direct comparison of requirements of the standard to features of the OEMS it is determined that the OEMS compares favorably with most requirements of the standard. A few areas are identified where improvements to the system would clarify alignment with the standard.

Several Chevron business units have had experience with deploying the ISO 14001 system and the OEMS. Leaders in these businesses were interviewed to assess their opinions of the comparability of the systems. In general, each leader felt the OEMS was quite comparable to the ISO 14001 standard and exceeded its requirements in areas.

The research also investigates the management system approaches employed by other international integrated energy companies as they are described in their external websites and compares them to the Chevron approach. One company, ExxonMobil, has extensive documentation on their Operations Integrity Management System available on their external

website. A comparison of the OEMS with the ExxonMobil system is also included. The ExxonMobil system has been maintained over several years, an external attestation to its conformance to the international standard. The high degree of comparability between the ExxonMobil system and the OEMS indicates that the OEMS could qualify as an ISO 14001 compliant management system.

NOTE

Views and statements contained in this paper do not represent the views of Chevron Corporation or any of its affiliates. Further, views and comments regarding other enterprises or their management systems represent the opinions of the author.

1.0 Introduction

1.1 Topic

This research will evaluate the adequacy of Chevron's Operational Excellence Management System (OEMS) used to integrate environment, health, safety, efficiency, and reliability activities into overall business management requirements in comparison to what would be expected under the ISO 14001 International Environmental Management Standard. The investigation will examine environmental management, which is the focus of ISO 14001, as well as the related aspects of health, safety, efficiency and reliability which are additionally addressed under the OEMS. An effective management system not only serves the organization in integrating vital responsibilities into the business, it also lends assurances to external stakeholders that the organization is responsibly operating in a manner that sustains the business and helps the business co-exist with the communities in which they operate.

1.2 Significance of the Topic

This topic is important because the choices an enterprise makes to manage its environmental, health and safety activities have great implication with respect to its success and sustainability. Failure to properly manage these activities can be damaging to the organization and the people and environment near their operations. Within the energy industry, there are various types of organizations dedicated to oil and gas production, refining and marketing, chemical manufacture, energy production and distribution, and other related activities. Some are large corporations with publicly traded stock shares that are international in scope and fully integrated throughout these activities. Some are privately owned or publicly traded share companies that are smaller in geographical span and are not integrated though all segments of the industry. Still others are nationalized businesses, wholly controlled by a sovereign government. Regardless of the scope and span of the enterprise,

the energy industry is linked with substantial risk regarding management of environment, health and safety issues. Placing these issues along with other business management requirements reflect their importance in the values of the business and fully integrates them. When these energy companies choose to manage their EHS responsibilities through a system, they must determine if the system is to be uniform throughout the enterprise or addressed on a site-by-site basis. The peer group of companies used by Chevron to compare business performance includes British Petroleum, ConocoPhillips, ExxonMobil, British Petroleum and Royal Dutch Shell Group. The management system approaches adopted by these enterprises are reviewed in the literature review portion of this thesis. Additionally, one nationalized upstream oil and gas enterprise, Kuwait Oil Company, is also briefly reviewed.

1.3 Primary Research Objective

This review will make an assessment of the Chevron Operational Excellence Management System in comparison with the ISO 14001 – Environmental Management Systems standard to identify any significant deviations from the requirements of the standard. The ISO standard is limited in scope to the environmental concerns. As the OEMS is designed to address concerns beyond the primary scope of the ISO standard to include safety, health, reliability and efficiency, the additional benefits of OEMS will be noted.

1.4 Secondary Research Objective

This thesis will look at the management system choices made by other oil and gas companies in Chevron's peer group to assess significant differences in approach.

1.5 Acronyms and Definitions

ANSI – American National Standards Institute

Downstream - when referring to the oil and gas industry, this term indicates the refining and marketing sectors of the industry. More generically, the term can be used to refer to any step further along in the process (SPE terminology).

EHS – Environment, Health, and Safety. Most organizations use this term or others like it, (HSE, SHE, HES) to describe their unified approach to these interrelated disciplines. Use of these acronyms throughout this paper employ the acronym preferred by the respective organizations.

ISO – International Organization for Standardization. "ISO is a network of national standards institutes from 146 countries working in partnership with international organizations, governments, industry, business and consumer representatives. A bridge between public and private sectors" (ISO frontpage).

ISO 14001 – The environmental management system established by the International Standards Organization through the international standard titled ISO 14001 Environmental management systems – Requirements with guidance for use. In this document this is referred to as ISO 14001, or the standard or the international standard. (ANSI/ISO 14001)

OE – Operational Excellence – This is the systematic management of safety, health, environment, reliability and efficiency to achieve world-class performance. Operational Excellence (OE) is one of the strategic intents of Chevron. (Chevron Way)

OEMS – Operational Excellence Management System is the name of the management system used by Chevron to manage health, safety, environment, efficiency and reliability (Chevron OEMS).

OIMS - Operations Integrity Management System is the name of the management system used by ExxonMobil to manage health, safety, environment, and security (ExxonMobil OIMS)

Upstream – the exploration and production portions of the oil and gas industry (SPE terminology).

2.0 Background

Organizations take various approaches to manage environmental issues. Since the advent of major environmental concern and awareness in the 1960s and 1970s, managing environmental performance has become increasingly complex. In the realm of environmental performance, an enterprise's visions and values are supported by policies, which are supported by various standard operating procedures, practices, processes, and guidelines. These layers of management are established to drive an enterprise to be in compliance with applicable rules and regulations where they operate, and in many cases, extend beyond compliance to reach their stated visions and values. Enterprises which are global or operating in various locations under diverse regulatory structures have even more complex duties to maintain compliance. Some jurisdictions have more demanding regulatory requirements, while others are less evolved. Without an over-arching system to address environmental performance, the management of the organization has greater uncertainty that all activities affecting the environment and regulatory requirements are properly addressed. International markets, promulgation of differing environmental standards and regulations in various countries, and diverse approaches to environmental management by companies were all drivers towards an international standard for environmental management systems (Voorhees and Woellner 5).

One means to accomplish satisfactory management of environmental performance is through an international management system standard. This has been developed in ISO 14001 (ANSI/ISO 14001). With the advent of ISO 14001, the international standard for environmental management systems, the standard of professional practice is well established. Friedman (289) calls ISO 14001 the foundation of the ISO 14000 series and it is

the environmental management system specification designed to establish the conduct of environmental affairs via a system that is integrated into the organization's overall management activity. Generally, the adoption of a management system or the ISO standard is considered a voluntary approach that encourages improved environmental performance and aids in making this performance part of the core business activities.

The outcome of improving environmental performance and driving this performance into the foundation of the business values can also be accomplished with other management systems not associated with ISO 14001. Often companies widen the aims of their management systems beyond the realm of solely environmental processes to include health, safety and other aspects. These additional aspects are strongly linked with environmental performance and vary primarily in the span of the focus of the potential impacts.

- Health Performance – Relevance to the impacts on an individual's personal well-being
- Safety Performance – Relevance to the impacts on the well-being of a population of workers at a site.
- Environmental Performance – Relevance to the impacts on population within and outside a site into the surrounding community and environmental media – air, water, soil, etc.

This choice expands the management system beyond the scope of ISO 14001 – environmental management only and gives the organization's management assurance that critical business interests, like health and safety are competently managed in a similar manner through the common system (Redinger and Levine).

Chevron has a corporate management system which embraces not only environmental aspects, but health, safety, efficiency and reliability. It is called the Operational Excellence Management System (Chevron OEMS). This management system has evolved to its present form since 2001. Generally speaking, the OEMS is not designed to adhere to ISO 14001. A few discrete Chevron businesses sought and received ISO 14001 certifications prior to the advent of OEMS. Their maintenance of these certifications is a local business decision executed where host governments or business partners require this or where competitive advantage is realized by holding the certification. Additional information on these Chevron businesses is found in section 5.3 of this document.

Use of the OEMS is mandatory in all Chevron operating companies or where Chevron serves as operator in joint ventures. As local implementation of the OEMS varies, this review will assess the general system deployed throughout Chevron.

3.0 Literature Review

3.1 Background Literature

3.1.1 What is ISO 14001?

ISO 14001 is an international standard for environmental management systems established to state the standard of professional practice in this area. It is a consensus standard that represents minimum requirements for a systematic approach to environmental management. Consequently, the standard allows considerable latitude to customize a management system to a specific organizations needs, yet sets the core framework a system requires to meet the standard level of professional practice. ISO 14001 was developed the mid-1990s. After several decades of environmentalism and regulatory development spreading world-wide, diverse approaches to environmental management evolved. ISO 14001 was developed in response to pressures from regulators, corporations and governments. These pressures were coming from concerns about global markets, diverse geographical, cultural, and social conditions. It provides for organizations to establish elements of an effective environmental management system which integrates the environmental aspects of their business with other management requirements. The system is designed to stem from the organization's environmental policy and objectives to control the impacts of their activities, products, and services (ANSI/ISO 14001).

Figure 1 illustrates the essence of the ISO 14001 Environment Management System model (ANSI/ISO 14001 vii). It is an iterative cycle of continuously improving environmental performance rooted in a strong environmental policy. It is followed by planning steps to support the policy; implementing and operating under those plans; checking and correcting

progress relative to the plans; and finally review by management to re-cycle to the policy and planning process.

ISO 14001:2004(E)

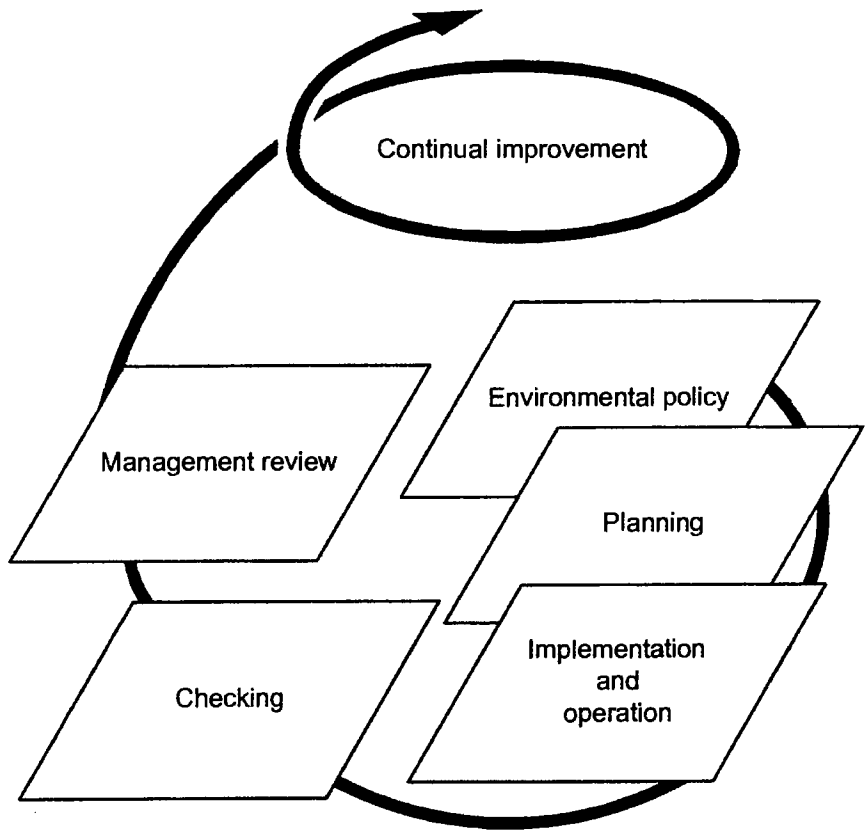

Figure 1. Environmental management system model for the ISO 14001 International Standard (ISO 14001:2004 vi)

It is important to note that the standard does not require or guarantee that an organization will meet any established absolute performance levels beyond its own commitments. It is truly a voluntary effort. There has been considerable concern about ISO 14001 that the standard does not require or ensure an organization is within regulatory compliance in order to be

certified (Morelli 82). Commitment to regulatory compliance must be grounded in the tenets or values of the corporation, as this is not a requirement of the standard. This situation brings added importance of an underlying management commitment to a strong set of values and vision-based policy coupled with the requirement to ensure continuous improvement (ANSI/ISO 14001 vii).

The ISO 14001 standard relies on accredited, independent third-parties to verify an organization's conformance with standards as a means to assure regulators and other stakeholders that the organization is applying measures to sustain improved environmental performance (Redinger and Levine 35).

Table 1 describes the family of standards set up by the International Organization for Standardizations relating to environmental management (iso.org). These are known as the ISO 14000 family of standards and ISO 14001 is the fundamental standard addressing environment management systems.

Table 1. The ISO Environmental Management Standards	
ISO 14001:1996	Environmental management systems – Specification with guidance for use
ISO 14001:2004	Environmental management systems – Requirements with guidance for use
ISO 14004:2004	Environmental management systems – General guidelines on principles, systems and support techniques
ISO 14015:2001	Environmental management – Environmental assessment of sites and organizations
ISO 14031:1999	Environmental management – Environmental performance -- Guidelines
ISO/TR 14032:1999	Environmental management – Examples of environmental performance evaluation
ISO 14040:1997	Environmental management – Life cycle assessment – Principles and framework
ISO 14041:1998	Environmental management – Life cycle assessment – Goal and scope definition and inventory analysis

ISO14042:2000	Environmental management – Life cycle assessment – Life cycle impact assessment
ISO 14043:2000	Environmental management – Life cycle assessment – Life cycle interpretation
ISO/TR 14047:2003	Environmental management – Life cycle impact assessment – Examples of application of ISO 14042
ISO/TR 14049:2000	Environmental management – Life cycle assessment – Examples of application of ISO 14041 to goal and scope definition and inventory analysis
ISO 14050:2002	Environmental management – vocabulary
ISO/TR 14061:1998	Information to assist forestry organizations in the use of Environment management System standards ISO 14001 and ISO 14004
ISO/TR 14062:2002	Environmental management – Integrating environmental aspects into product design and development

3.1.2 What is the Chevron OEMS?

OEMS is the Chevron Operational Excellence Management System. Chevron has chosen to embrace a wider range of business responsibilities, beyond environmental aspects, into their management system. The Operational Excellence Management System includes environment, health, safety, efficiency, and reliability. It is widely recognized that these aspects are interrelated and very important to a business. The introductory text of ISO 14001 also acknowledges this and states that:

> This International Standard is not intended to address, and does not include requirements for, aspects of occupational health and safety management; however, it does not seek to discourage an organization from developing integration of such management system elements. Nevertheless, the certification/registration process will only be applicable to aspects of the environmental management system (ANSI/ISO 14001 viii).

For many organizations, including Chevron, the addition of the health and safety aspects is logical due to the inter-relatedness of the EHS aspects. Inclusion of efficiency and reliability aspects expresses that they too are interrelated and important. This over-arching system reaches the entire workforce, extending responsibility beyond EHS professionals and leadership. In this way, "Operational Excellence is the systematic management of safety, health, environment, reliability and efficiency to achieve world-class performance" (Chevron OEMS 1).

The Chevron Operational Excellence Management System is a management system that has been customized to suit the business needs, risks, aspects and impacts of the diverse Chevron world-wide businesses. Because it has been adapted to cover a wider range of issues than ISO 14001, which is a framework for environmental management systems, OEMS is a more extensive and complex system. The brochure text documenting is features is consequently more extensive. The core pages of the ISO Standard comprise eight text pages (ANSI/ISO 14001). The framework of the OEMS comprises about ten pages. Within these pages are the descriptions of the three main components of the OEMS – Leadership Accountability, the Management System Process and OE Expectations (Chevron OEMS 4-13).

At its heart is the involvement of leadership in ensuring the process is focused on delivering improved performance to the betterment of the corporation's business. The roles, behaviors and responsibilities of leadership to drive the management system are described in the OEMS component called Leadership Accountability. As with the ISO 14001 model, the

OEMS Management System Process model is iterative and strives for continuous improvement. Figure 2 displays the model for the OEMS.

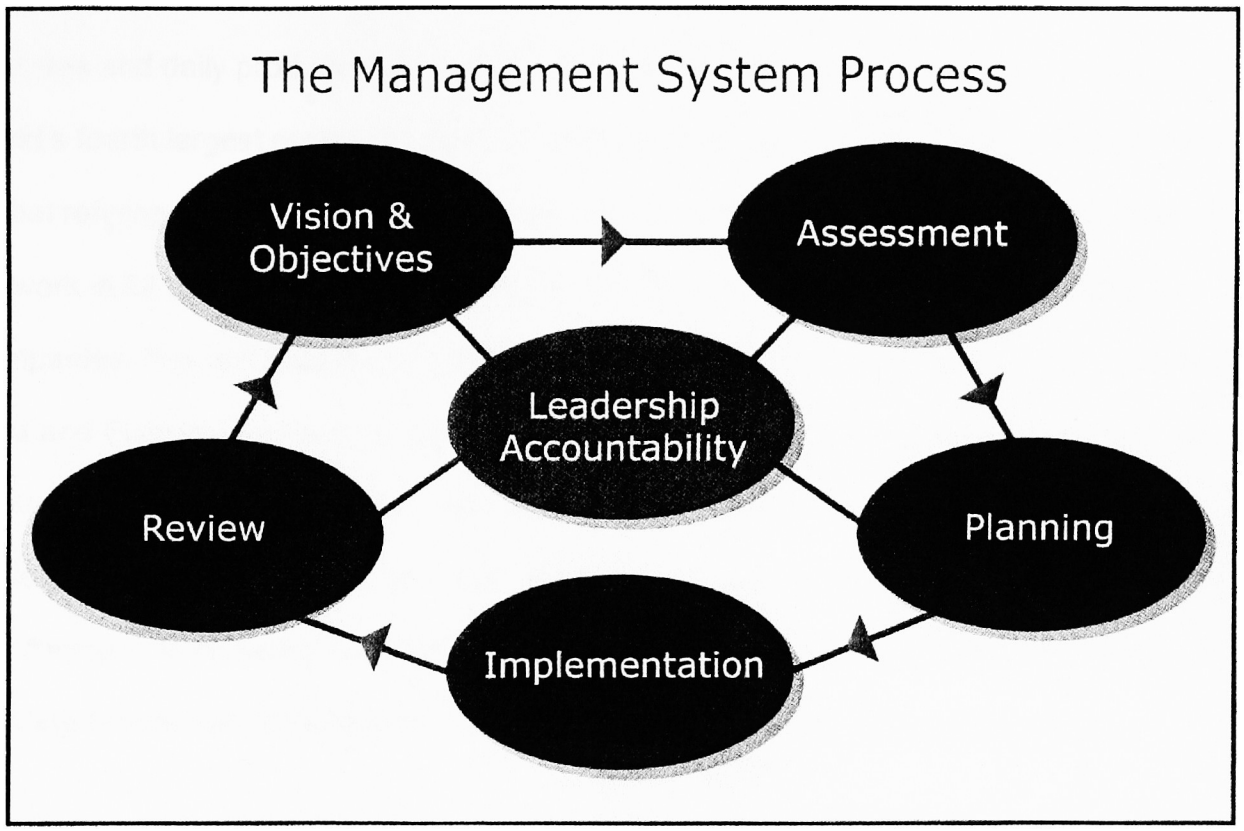

Figure 2. The Chevron Operational Excellence Management System model.

The Chevron Operational Excellence Management System also has elements and expectations that comprise the requirement of implementing the system. This component is called the OE Expectations and is comprised of thirteen elements, supported by forty-six expectations. Processes to meet the expectations are either set as standards by the corporation or are developed by discrete businesses (Chevron OEMS 8-13).

Chevron is an integrated energy company headquartered in San Ramon, California, and active in more than 180 countries. It is engaged in every aspect of the oil and gas industry,

including exploration and production; refining, marketing and transportation; chemicals manufacturing and sales; and power generation. The Chevron work force is approximately 53,000 people. Chevron has approximately 13 billion barrels of oil-equivalent net proved reserves and daily production of 2.8 million net oil-equivalent barrels per day, making it the world's fourth largest publicly traded oil company based on reserves (Gold). Chevron has a global refining capacity of 2.2 million barrels of crude oil per day and a worldwide marketing network in 84 countries with approximately 24,000 retail sites, including those of affiliate companies. The company also has interests in power generating assets in the United States, Asia and Europe. Chevron develops and commercializes advanced energy technologies, including fuel cells, photovoltaics and advanced batteries, and is active in research and development efforts to utilize hydrogen as a fuel for transportation and power. Additionally, the company is investing in the field of nanotechnology, evaluating a new class of molecular building blocks that potentially may be useful in many industries (Chevron.com).

3.2 Management System Approaches of Peer Companies

3.2.1 British Petroleum

British Petroleum (BP) is an international, integrated energy company with approximately 103,000 employees and operating in over 100 countries. As its name states, British Petroleum is headquartered in Britain. It holds oil and gas reserves of 18.6 billion barrels. Produced daily are 2.5 million barrels of crude oil, 8.5 billion cubic feet of gas and 2.5 million barrels of refined product for sales (About BP).

British Petroleum extends their approach to management systems to include health, safety, and environmental aspects. BP has made strong efforts to promote corporation-wide

management systems to support their long term goals – "no accidents, no harm to people and no damage to the environment". BP state that "Everyone who works for BP, anywhere, is responsible for getting HSE right". BP corporate framework for management systems is called 'Getting HSE Right'. This framework, in place of a corporate management system, sets expectations for performance to be achieved by local business units. Major operational sites are all required by 'Getting HSE Right' to use the international environmental management systems standard ISO 14001. By the end of 2004, all had achieved this goal and been certified to this standard by independent auditors. In 2005, they plan to update 'Getting HSE Right' to include security management systems. (BP Management and Compliance)

3.2.2 ConocoPhillips

ConocoPhilips is an international, integrated energy company and is the third largest energy company headquartered in the United States, based on market capitalization, oil and gas proved reserves and production; and the largest refiner of petroleum in the United States. Its headquarters is in Houston, Texas. ConocoPhillips operates in more than 40 countries with approximately 35,800 employees. Excluding government-held petroleum reserves, ConocoPhillips has the eighth largest total of proved reserves and is the fifth largest refiner in the world (ConocoPhillips we are).

ConocoPhilips has chosen to manage health, safety, and environmental aspects of their businesses through a systematic approach. In part, their corporate policy states, "Wherever we operate, we will conduct our business with respect and care for both the local and global environment and systematically manage risks to drive sustainable business growth". (ConocoPhillips Policy). However, there is not an enterprise-wide system. Each business

unit implements an HSE management system tailored to their specific needs. However, the corporation does have mandatory issue-specific health, safety and environmental requirements. Through this approach, some of the ConocoPhillips business units have received ISO 14001 certification for their discrete locations. ConocoPhillips' 2002 corporate annual report states that the following are certified to ISO 14001: China Exploration & Production; Hartford, Illinois Lubricants Plant; Humber Refinery in the United Kingdom; and the Sulphur, Louisiana Lubricants Plant. (ConocoPhillips 2002 Annual Report 33)

3.2.3 Exxon Mobil

ExxonMobil is an integrated energy company and is recognized as the industry leader in each of its core businesses. It is the largest gas marketer and holds the largest reserves of any non-governmental energy enterprise. Its oil and gas reserves are estimated at 22 billion barrels. They are headquartered in Irving, Texas and conduct business in nearly 200 countries. Oil production exceeds 2.5 million barrels per day and gas production exceeds 10 billion cubic feet per day (ExxonMobil Our Company).

Like Chevron, ExxonMobil employs a management system that extends beyond environmental aspects. Its Operations Integrity Management System manages environment, health, safety and security to ensure its facilities are in compliance with all regulations and with company-set performance guidelines. The OIMS framework is comprised of eleven elements with underlying principles and expectations. (ExxonMobil OIMS)

Soon after ISO 14001 was established, ExxonMobil self-certified that the management system was compliant with the international standard. In 1998 and again in 2001,

ExxonMobil received an external attestation process. This process confirmed that the system met the requirements of ISO 14001 and was implemented company-wide. (Exxon Lloyd's)

3.2.4 Royal Dutch Shell

The Royal Dutch Shell Group of Companies is an international integrated energy enterprise of energy and petrochemical companies operating in about 45 countries. The company has for decades been two separate companies headquartered in the Netherlands and United Kingdom. There are approximately 119,000 employees working in the companies. Royal Dutch Shell produces about 3% of the world's oil and 3.5% of the world's gas. Other core operations include: marketing, transporting and trading oil and gas; providing oil products for industrial uses including fuel and lubricant for ships and planes; generating electricity, including wind power and producing solar panels; producing petrochemicals that are used for plastics, coatings and detergents; and developing technology for hydrogen vehicles (Shell guide).

The Royal Dutch Shell Group of Companies describes itself as a "decentralized, diverse group of companies with widespread activities and each Shell company has wide freedom of action" (Shell Business). Perhaps because of this freedom and decentralization, Shell does not prescribe a specific corporate environmental management system. Their policy regarding environment, health, and safety states that every Shell company has a systematic approach to HSE management to ensure compliance with the law and to achieve continuous performance improvement (Shell HSE Policy). The specific ISO 14001 or other system for each business unit is considered proprietary (Brown).

There is a movement to create a less centralized organization. In July 2005, the two entities comprising the Anglo-Dutch enterprise, Shell Transport & Trading and Royal Dutch Petroleum Co., agreed to merge and unify under a single Board of Directors (WSJ–Shell). The new organization is called Royal Dutch Shell Plc. and will be headquartered in The Hague, Netherlands with a primary stock listing in London. The unification is being enacted to streamline the century-old management structure which was blamed for a damaging oil reserves overbooking scandal. It will also enable the unified stock share to facilitate easier acquisitions of other businesses. (Reuters-Shell). The streamlined organization could allow a more unified and centralized approach to other business practices such as environmental management.

Royal Dutch Shell does, however, state minimum performance standards regarding the environment. These cover minimum expectations for their businesses in eleven areas – external certification, external verification, CFCs/Halon, continuous flaring & venting, SOx/NOx/oil in water, chemical discharges, produced water, oil-based muds, groundwater monitoring, safety data sheets, and incident reporting/investigation. The external certification minimum standard is regarding the environment component of the HSE management system for Shell business units and states they "are encouraged to have their environmental management systems certified against recognized, independent system standards, such as ISO 14001 or the European Union's Eco-Management and Audit Scheme" (Shell Minimum Standards).

3.3 Nationalized Oil Company

3.3.1 Kuwait Oil Company

The Kuwait Oil Company manages the production of oil and gas in the State of Kuwait. Kuwait is said to control about 96 billion barrels of oil reserves and has a daily production capacity of about 2.5 to 3 million barrels (Kuwait Oil and Industry). As a point of comparison to major, international energy companies, the management system employed by this nationalized upstream company is of interest. Nationalized oil companies are not driven by business pressures from competition and shareholders in the same manner as are international integrated energy companies. Although their accountabilities and stakeholder relationships are different from private or publicly traded companies, the benefits of a management system approach can be realized. Kuwait Oil Company has only recently engaged a health, safety, and environment management system, with its adoption in 2003. It was aided in its development through a technical service consulting arrangement with British Petroleum (Al-Gharabally). The management system is still in the implementation stages and is comprised of twelve elements, twelve aims, and 85 expectations (KOC HSEMS).

The parent company for Kuwait Oil Company, the Kuwait Petroleum Company, is working towards an environmental management system approach to cover all of their subordinate companies in addition to the exploration and production entity. This system is still under development and it will not be fully installed for an extended time (Al-Shatti).

3.4 Current Issues and Trends

3.4.1 ISO 14001:2004

ISO 14001:1996, the original standard has been updated in 2004. The update does not substantively alter the standards general requirement. Most of the revisions are clarification of terminology, upgrades in user-friendliness, and re-titling some sections. One additional section involves an Evaluation of Compliance section, not in the previous version. Table 2 outlines the changes between the 1996 version and the 2004 version. These revisions were released on November 15th 2004. There is an 18 month transition period for accreditors to begin issuing new certificates of accreditation to the new standard (ISO 14000:2004).

Table 2. Overview of the changes in ISO 14001 in the 2004 version (ISO14000:2004).

ISO 14001:2004	Overview of Change
4.1 General Requirements 4.3.1 Environmental Aspects	Rearticulated for clearer meaning, with enhanced terminology.
4.2 Environmental Policy 4.4.6 Operational Control 4.4.7 Emergency Preparedness And Response	Updated to reflect terminology enhancements and clarification of the requirements.
4.3.2 Legal and Other Requirements	Provides clarification to the requirements and divides the requirement into sub paragraphs, allowing for ease of understanding.
4.3.3 Objectives, Targets and Programme(s)	The addition of Programme(s), is an instinctive addition to the specification, bringing together the key activities of the system.
4.4.1 Resources, Roles, Responsibility And Authority	The title is updated and includes terminology enhancement for clarification of the requirements.
4.4.2 Competence, Training and Awareness	The title is updated and includes an emphasis on demonstrating competence and training documentation.
4.4.3 Communication	This section includes the addition of "internal" communication in addition to external communication (similar to OSHAS 18001 Health & Safety Management System or HSMS standard).
4.4.4 Documentation	The "Environmental Management System Documentation" has been updated and re-titled to "Documentation" and includes a clearer intent of the significant environmental aspects documentation.
4.4.5 Control of Documents	The title is updated and includes enhanced clarity to the requirement, allowing for ease of understanding.
4.5.1 Monitoring and Measurement	A re-write of the paragraph for clearer meaning and the addition of calibration.
4.5.2 Evaluation of Compliance	The revision adds "Evaluation of Compliance" as a separate requirement within the Environmental Management System. The emphasis on compliance requires developing a documented process that includes evaluating and maintaining the results of periodic evaluations of compliance with applicable legal requirements.
4.5.3 Nonconformity, Corrective	Provides clarification and restructures the requirement into sub

Action and Preventive Action	paragraphs, allowing for ease of understanding.
4.5.4 Control of Records	Updated title, with a restructure of the paragraph and terminology for ease of understanding with an emphasis on control of conformity records.
4.5.5 Internal Audit	Updated title and an emphasis on independent auditors.
4.6 Management Review	Management Review process is updated to include the identification of inputs and outputs. The addition of identifying inputs and outputs aligns ISO14001:2004 to ISO 9000:2000, moreover, the revision clarifies the description of the information that needs to be collected and reviewed by top management.

Although the summary table hints that the transition from the 1996 version to the 2004 version will be nearly seamless and be 'business as usual', Lloyd's Register Quality Assurance warns that organizations must be aware of subtle changes that will require review and perhaps amendments to their system to ensure conformance (Lloyd's 1).

3.4.2 Certification and Registration

ISO 14001 allows organizations to affirm conformance to this standard through external certification of the environmental management system or through self-certification. The external certification lends credibility and integrity to the process that self-certification cannot. Further, a company can install a conformant environmental management system and forego any type of certification, to reap the benefits of improved performance and integrating environmental performance into the other management obligations of business. Although the process of certification can be inconvenient and expensive, most organizations seek significant recognition and benefits from the external certification. Registration as certified to the ISO 14001 standard results in entry into a group of world-class organizations, enhancing their image to customers and partners, decreasing liability exposure, and providing mechanisms to lowering costs and potential penalties (Voorhees and Woellner 229).

For a company to become certified, an external registrar must make a series of registration audits. The preparation and execution of the audits of the certification process can be expensive and time consuming. For this reason, registrations are often performed for discrete business sites. In October 2004, in excess of 74,000 registrations in 13 countries were counted by ISO World (ISO World).

3.4.3 Attestation

Large, multinational companies with uniformly deployed systems might be discouraged from the expense and inconvenience of coordinating site-by-site registration. ExxonMobil has taken the approach to seek a corporation-wide external attestation of their Operations Integrity Management System. The pathway towards this attestation for ExxonMobil included an internal comparison by ExxonMobil of their system against the ISO standard. This was affirmed in 1998, two years following the promulgation of the standard. ExxonMobil then took the step of having the external auditor Lloyd's Registered Quality Assurance, Inc. attest to this condition that same year. This attestation has been maintained since then (Exxon Lloyd's).

Like certification, the purpose of attestation is to verify that the Operations Integrity Management System meets all the requirements of ISO 14001. The attestation is a process to review the internal processes the company uses to assess conformance with the OIMS and evaluate the integration of the system into ongoing business activities (Exxon Lloyd's).

The difference between certification and attestation is subtle.

"Both include third party review resulting in a statement declaring conformance to ISO 14001 which covers management system design, content, broad implementation and integration into ongoing business activities. For attestation, Lloyd's Registered Quality Assurance focuses their assessment on the internal processes ExxonMobil uses to evaluate the suitability, adequacy and effectiveness of its integrated environmental, health and safety management system rather than directly evaluating the effectiveness of the system as is normally done for certification.'

"Every third year, Lloyd's undertakes a comprehensive assessment and validates the effectiveness of our management system by verifying ExxonMobil's own assessments against a physical verification by Lloyd's own assessors. They are free to verify against all major business functions and from a broad geographic and cultural perspective. Nine site verifications were made in 2001.'

"Annually, Lloyd's conducts a review at Corporate headquarters and the headquarters of one or two worldwide functional business units (Upstream and Downstream headquarters visited in summer 2002). The review assesses efforts to continually improve environmental management systems, management leadership and expectations, and check the frequency and quality of assessments completed during the prior year by the company against its assessment plans and standards. This interim review is intended to verify that ExxonMobil continues to meet the requirements of ISO 14001.'

"The major difference is that the attestation is achieved with fewer detailed assessments annually." (Exxon Lloyd's)

One key to the Exxon Mobil use of this attestation process is their confidence that their system has been effectively deployed throughout their widespread international businesses. This confidence comes from the use of their internal assessment audit processes and the skills of their professionals conducting the assessments. Further, they feel the attestation process can meet the expectations of their customers and others interested in their performance at significantly lower cost (Exxon Lloyd's).

Chevron has begun the process of evaluating their Operational Excellence Management System in comparison to the ISO International Environmental Management Standard. They have hired a contractor to conduct an evaluation and site visits (Lydeker).
This strategy may lead to a similar attestation of the Chevron OEMS in a similar manner as ExxonMobil.

4.0 Methodology

This section identifies the methodology used to answer the primary research question regarding the assessment of the Chevron Operational Excellence Management System in comparison with ISO 14001 to identify any significant gaps. Secondarily, the management system approaches of other peer energy companies are reviewed to assess significant differences in approach.

4.1 Tasks and Objectives

4.1.1 Review of the ISO 14001 Standard

This research effort is to review in detail the ISO 14001 standard to identify clauses that are requirements. This review identifies, within the standard, terms such as "Shall". The objective is to determine the core requirements of a compliant management system in the context of the actual text of the standard. ISO 14001 has the following major divisions; Scope, Normative references, Terms and definitions, and Environmental management system requirements. Within the last section, environmental management system requirements are the specifications for a compliant management system within these subsections:

- General requirements
- Environmental policy
- Planning
- Implementation and operation
- Checking

- Management review

4.1.2 Overview of Chevron OEMS

This task has the objective of describing in more detail the Chevron Operational Excellence Management System.

4.1.2.1 OEMS Model & Structure

The OEMS is laid out as a model requiring an iterative cycle of vision and objective setting, assessment, planning, implementing plans, and reviewing performance against the vision and objectives. Each aspect of the system is driven by enlightened and active leadership. The system is comprised of thirteen elements. These are designed to drive world-class performance in the aspects of safety, health, environment, reliability and efficiency. Each element has one or more associated expectations which spell out specific requirements for the management of safety, health, environment, reliability, and efficiency. The expectations are met through processes put in place by local management. In many cases, a single process or program can fulfill the intent of one or more expectations. In other cases, one expectation may require several processes to be put in place. Some expectations are supported by a Chevron standard process used company-wide (Chevron OEMS 8). Processes used to fulfill expectations are set up with five components:

- Purpose, Scope and Objectives
- Procedures
- Resources
- Measurements and Verification
- Continual Improvement

(Chevron OEMS 9).

4.1.2.2 Experience within Chevron with ISO 14001 and the OEMS

Several Chevron business units and facilities have had experience with ISO 14001 certification, as well as the application of the OEMS. Prior to the implementation of the over-arching corporate OEMS program, these businesses were certified under ISO 14001 due to site-specific issues and business drivers. A review of their collective experience with the systems is researched and summarized.

4.1.3 Comparison of ISO 14001 to the OEMS

This task involves side-by-side comparison of the requirements of ISO 14001 with the OEMS. The core requirements of ISO 14001 are be compared with the contents of the OEMS as deployed by Chevron to determine the conformance of the OEMS with the international standard. Components of the OEMS are compared with requirements in the standard and given an evaluation rating. These ratings will state what areas the OEMS exceeds the requirements of the ISO 14001 standard or provides a high degree of assurance of alignment; areas where the OEMS gives assurance of meeting the standard but may have areas of weakness or concern; and areas where the OEMS does not provide reasonable assurance of compliance. Where possible, areas of concern will be described. Rating terminology are:

- Good - the OEMS exceeds the requirements of the ISO 14001 standard or provides a high degree of assurance of alignment
- Satisfactory - areas where the OEMS gives assurance of meeting the standard but may have areas where details are lacking in the documents reviewed

- Less Than Satisfactory - areas where the OEMS does not provide reasonable assurance of conformity with the ISO 14001 standard

4.1.4 Peer Energy Companies

This task briefly assesses the management system approaches of peer operators to determine their general approach and any similarities or significant differences. The approach used by ExxonMobil is most similar to Chevron's OEMS in structure and approach of all the peer companies. These two systems are examined in greater detail and a tabular comparison chart is prepared.

5.0 Results

This research examined several areas. First, it establishes the core requirements of the ISO 14001:2004 standard. The core requirements were determined by evaluating statements in the standard which utilize the word "shall". These statements frame the actions and processes an enterprise must have in place to conform to the standard. They also indicate the items an internal or external auditor could review to certify conformance. Next, the Chevron Operational Excellence Management System is reviewed. This system strives to manage additional aspects of safety, health, reliability, and efficiency; in addition to environmental performance. Several operations and businesses within Chevron have experience seeking and maintaining certification to the ISO 14001 standard, along with implementing the OEMS. A brief review of their experiences with these systems is presented. The next set of results evaluates the degree to which the Chevron OEMS satisfies the core requirements of the international standard by direct comparison of the core ISO 14001 requirements with the correlative component features of the OEMS. A final review is made of peer energy companies' approach to a management system. These show the variability of systems addressing comparable risk in these companies.

5.1 ISO 14001:2004

The international standard, ISO 14001:2004 Environmental management systems – Requirements with guidance for use, contains 59 "shall", or requirement statements in the body of the main document. These statements imply that these features must exist in an environmental management system that is compliant with the standard. These "shall" or requirement statements provide the clear guidance for an entity designing and implementing

a management system. The same statements also provide the roadmap for an external or internal auditor of the system to adequately assess the system.

5.1.1 General Requirements

The first two requirement statements are within the clause 4.1 – General Requirements. The organization shall establish, document, implement and continually improve an environmental management system in accordance with the standard and the organization shall define and document the scope of the system.

5.1.2 Environmental Policy

Clause 4.2 – Environmental policy lists a number of features that shall be defined within the policy established by the top management of the organization. These include the requirements that the policy: be appropriate to the nature and risks of the business; includes a commitment to continual improvement and prevention of pollution; includes a commitment to comply with applicable legal and other related requirements; provides a framework for setting and reviewing environmental objectives and targets; is documented, implemented and maintained; is communicated to all working for the organization; and is available to the public.

5.1.3 Planning

Within the planning portion of the standard, there are three subsections. The first deals with environmental aspects of the organizations activities, products and services and includes three requirement statements. The organization must establish, implement and maintain procedures to identify environmental aspects over which it has influence and determine which aspects have significant impacts on the environment. The organization must keep this

information up to date and must ensure that significant environmental impacts are accounted for in the management system. The next subsection deals with legal and other requirements and has two requirement statements. The organization must identify applicable legal and other requirements to determine how they apply to the environmental aspects. Also, the organization must ensure through the management system that these legal and other requirements are taken into account. The last subsection in the planning section deals with setting up targets, objectives and programs and it contains five requirement statements. The organization is required to set up environmental objectives, targets and programs. These targets shall be measurable, consistent with their policy, include commitments to pollution prevention, compliance with legal and other requirements and require continual improvement. When establishing and reviewing targets and objectives the organization shall take into account legal and other requirements and its significant environmental aspects. The organization shall also consider technological options, financial, operations and business requirements and the views of interested parties. Programs established to achieve targets and objectives shall designate responsibility at relevant functions and level of the organization and the means and timeframe by which they are to be achieved.

5.1.4 Implementation and Operation

The implementation and operation section of the standard includes seven subsections and twenty-three requirement statements. Under the subsection dealing with resources, roles, responsibility and authority, there are four requirements. Organization management shall ensure the availability of resources to establish and maintain the environmental management system. Roles, responsibilities and authorities shall be defined, documented, and communicated in order to facilitate environmental management. Top management shall

appoint a specific management representative, who shall ensure the environmental management system is in accordance with the standard and this position is to report to the top management on the performance of the system and recommendations for improvement.

Subsection 4.4.2 deals with competence, training and awareness through six "shall" statements. The organization shall ensure that persons performing tasks which can cause significant environmental impacts are competent in training, education or experience. Records of competence shall be retained. Training needs based on environmental aspects and the system shall be identified, training or other action shall be taken to meet the needs, and records shall be retained. Workers shall be aware of the importance of conforming to the environmental policy and management system, the impacts associated with their work on significant environmental aspects, their role in achieving conformity with requirements of the management system, and the consequences of departure from specified procedures.

Subsection 4.4.3 establishes four requirement statements dealing with communication. Communication regarding environmental aspects and the management system shall be maintained for internal levels and functions of the organization and a procedure for receiving, documenting and responding to relevant external communications is required. Regarding external communications, three requirement statements are made. The organization shall decide whether to communicate externally about its significant environmental aspects and shall document its decision. Should the decision be to communicate, a method shall be established for external communications.

Subsections 4.4.4 and 4.4.5 deal with documentation and control of documents respectively with four requirements. One lengthy "shall" statement within the standard addresses the topic of documentation. Documentation of the environmental management system shall include: the policy, objectives and targets; description of the scope of the system; description of the main elements of the system and how they interact; documents required by the ISO standard; and documents determined by the organization to be necessary to manage processes related to significant environmental aspects. Regarding control of documents and records, documents and records required by the system shall be controlled in accordance with standard subsection 4.5.4. Procedures shall be in place to: approve documents prior to issue; review, update and re-approve documents; ensure that changes and revision status are identified; relevant versions are available at the points of use; documents are legible and identifiable; pertinent external document required by the system are identified and controlled; and obsolete documents are identified and protected from unintentional use.

Operations associated with significant environmental aspects are addressed with a single "shall" statement in subsection 4.4.6 that covers critical control measures. The organization shall identify and plan operations identified with significant environmental aspects in line with the environmental policy, objectives and targets to ensure they are carried out under specified conditions by: establishing procedures where the absence of procedures could lead to deviations from the policy, objectives and targets; stipulating operational criteria in the procedures; and establishing procedures related significant environmental aspects of goods and services used by the organization and communicating these to suppliers and contractors.

The final subsection of implementation and operation deals with emergency preparedness and response. Four requirement statements deal comprehensively with these topics. The organization shall have procedures to identify potential emergency situations and potential accidents and how it will respond to them. The organization shall respond to actual emergency situations and prevent or mitigate associated adverse environmental impacts. The emergency preparedness and response procedures shall be periodically reviewed and appropriately revised, particularly after actual incidents. Emergency preparedness and response procedures shall be periodically tested where practicable.

5.1.5 Checking

Checking on the effectiveness of the environmental management system for the operation is critical. Section 4.5 has eighteen requirement statements designed to ensure that the compliant system assess the performance of the operations, compares performance with compliance requirements, corrects shortfalls and audits the management system itself. Five subsections address these areas.

Subsection 4.5.1 requires the organization to have procedures to regularly monitor and measure the key characteristics of its operations that have a significant environmental impact. The procedures shall include documenting information to monitor performance, operational controls and conformity with targets. The organization shall ensure good monitoring data quality and shall retain records.

Subsection 4.5.2 addresses evaluations of compliance with legal other requirements with four "shall" statements. It is required that the organization has procedures to periodically evaluate

compliance with applicable legal requirements and shall maintain records of the compliance review. Additionally, a procedure is required to evaluate compliance with other requirements to which they subscribe and shall keep records of the periodic evaluations.

When the organization conducts checking activities and discovers nonconformities, these are addressed by subsection 4.5.3. Four requirement statements are included. The organization shall have procedures for dealing with actual or potential nonconformities, including correcting and preventing other occurrences. The procedure shall include: identifying and correcting nonconformities and mitigating environmental impacts; investigating these nonconformities to determine causes; evaluating actions to prevent nonconformities and implementing actions to prevent occurrences; recording results of corrective and preventive actions; and reviewing the effectiveness of corrective and preventive actions. All actions shall be appropriate to the scale of problems and environmental impacts. The management system shall be amended as necessary based on these actions.

Three "shall" statements in subsection 4.5.4 address the requirements for maintaining records in accordance with the environmental management system and the standard. There must be a procedure for identification, storage, protection, retrieval, retention and disposal of records. Records must remain legible, identifiable and traceable.

Internal auditing of the design and effectiveness of the environmental management system is addressed in subsection 4.5.5 with four requirement statements. The organization shall, at planned intervals, conduct internal audits of the environmental management system to assess conformance to the standard, is implemented and maintained, and report the findings

to management. The audit program shall take into account the environmental importance of the operations and result of past audits. The audit procedure shall address scope and frequency of audits, the responsibilities and requirements for conducting audits, reporting results and retaining records. The audit process and auditors shall be objective and impartial.

5.1.6 Management Review

Section 4.6 of the standard requires review of the environmental management system by top management at planned intervals. The reviews shall assess needed improvements and changes to the system. Records of the management reviews must be retained. Management reviews shall include input on: results of internal audits and reviews of legal and other requirement; external communications and complaints; environmental performance measures; review of objectives and targets; status of corrective and preventive actions; results of prior management reviews; changing legal or other requirements; and suggestions for improvements. Outputs from the management reviews shall include decisions and actions consistent with commitment to continuous improvement.

5.2 Chevron Operational Excellence Management System

The Chevron Operational Excellence Management System is designed and maintained to effectively manage the global enterprise with relation to environment, health, safety, reliability and efficiency issues and risks. This management objective expands beyond the scope of an environmental management system designed under the ISO 14001 standard by managing safety, health reliability and efficiency aspects, as well as environmental. The development of the system goes back to the roots of regulatory compliance and corporate responsibility efforts in the early 1990's in Chevron and legacy companies, such as Texaco. The original

Operational Excellence Management System was established in 2001, around the time of the merger of the two companies Chevron and Texaco. Its implementation has become a ten year plan to achieve and sustain world-class performance in the areas of safety, health, environment, reliability and efficiency (10-year OE Strategy).

In 2001, fourteen elements provided the framework for the Operational Excellence Management System. Implementation of the system was mandatory throughout the enterprise, but priorities and targets were largely up to the discrete business units and locations. In 2002 and 2003, processes were specified corporate-wide to address four aspects of safety and reliability known to be of greatest risk and highest incident rates within Chevron: contractor safety, motor vehicle crashes, operational reliability and repetitive stress injury prevention. Within the first few years of the system's existence, business units were struggling with implementation. In 2004, the system was re-launched in its present form and efforts were made to clarify the system and provide more uniform implementation guidelines. In 2004, plans to achieve world-class performance in environmental performance were set with focus areas in developing standard processes in property transfer, reporting requirements, environmental impact assessment, and waste management. These are to be implemented in 2005. In 2005, processes are being developed to improve performance in health aspects in 2006 and beyond. In 2006, business units should reach or approach world-class objectives for safety, building on the maturation of processes implemented earlier. Consequently, the other processes will mature between 2007 and 2010 to realize full implementation (10-year OE Strategy).

In its present form, the Operational Excellence Management System has three parts: leadership accountability, an iterative management system process, and specific corporate-wide expectations. To develop competency within the corporation, a series of classroom and computer-based training sessions result in clearly understood leadership roles and behaviors and required certifications in the Operational Excellence System. This organizational capability in Operational Excellence support the realization of the Vision and Values Chevron has for the success of the management system and the success of the business as a whole.

> "Our vision for operational excellence directly supports our corporate vision 'to be the global energy company most admired for its people, partnership and performance,' With respect to operational excellence, our vision is 'to be recognized and admired by industry and the communities in which we operate as world-class in safety, health, environment, reliability and efficiency.'"
>
> "Operational Excellence is not something separate from our business; it is how we must run our business to achieve our vision of success" (Chevron OEMS).

To describe what is meant by world-class, the Overview of the OEMS brochure document (Chevron OEMS) states that the following corporate OE objectives have been established:

- Achieve and injury-free workplace.
- Eliminate spills and environmental incidents. Identify and mitigate key environmental risks.
- Promote a healthy workplace and mitigate significant health risks.
- Operate incident-free with industry-leading asset reliability.
- Maximize the efficient use of resources and assets.

5.2.1 Leadership Accountability

Leadership accountability is understood by Chevron as the single largest factor for success in OE. Through completing the certifications in OE and applying the system, leaders become fluent in the components of the system. Through the personal actions of leaders, the message is sent that OE is a priority and that zero incidents – whether related to safety, health, environment, reliability or efficiency – is attainable. Leaders are to ensure that the management system is implemented and that processes are put in place to satisfy all of the OE expectations and that resource, roles, responsibilities and accountabilities are fully aligned throughout the organization. Leaders are charged with assessing gaps between existing processes and OE expectations and prioritizing closing of gaps based on risk (Chevron OEMS).

5.2.2 Management System Process

The OE Management System Process is the systematic approach used by Chevron to drive progress toward world-class performance and is linked to the business planning process. This iterative process is graphically depicted in Figure 2 as an endless circle of the following steps – vision and objective setting, assessment of gaps between the current state and the objectives, planning measures to close the gaps, implementing the planned actions, and reviewing annually the system activities to ensure progress (Chevron OEMS).

The management system approach is applied by each business unit to integrate into their business planning cycle six critical activities to drive improved performance. These are related to the OE expectations which will be discussed in the sub-section following. The six activities are:

1. Determine the applicability of each OE expectation

2. Map existing process to the expectations
3. Prioritize the processes used to meet the expectations
4. Design and implement an OE process to drive OE results
5. Measure and verify that the process is achieving the expectation
6. Continually improve the OE process to improve OE performance

5.2.3 OE Elements and Expectations

The OE expectations are corporate-wide requirements for site-specific measures to control risks inherent to the business. Most businesses have understood and dealt with the inherent risks for many years and have implemented programs, processes or procedures to address them. The OE expectations are the management system's approach to ensuring a uniform, over-arching set of requirements for the business units and operations to meet to manage safety, health, environment, reliability and efficiency. The OE expectations are organized under thirteen elements:

1. Security of Personnel and Assets
2. Facility Design and Construction
3. Safe Operations
4. Management of Change
5. Reliability and Efficiency
6. Third-Party Services
7. Environmental Stewardship
8. Product Stewardship
9. Incident Investigation
10. Community Awareness and Outreach

11. Emergency Management

12. Compliance Assurance

13. Legislative and Regulatory Advocacy

Within these thirteen elements, there are forty-six specific expectations. Each element contains from one to nine expectations that are to be met by processes and procedures put in place by local management. In some cases, a single process or program may fulfill the intent of one or more expectations. In other cases, one expectation may require several processes to be put in place (Chevron OEMS). Additional information on the content of the elements and expectations of the Chevron Operational Excellence Management System is in Appendix A.

5.2.4 Processes

Some expectations are supported by standard processes. Standardized processes are set at the higher levels of the corporation for selective processes. These address OE expectations that have some critical risk or performance gap or have corporate reporting requirements. They allow the business units and operations avoid duplicative efforts in developing processes, use best practice expertise and eases retraining inefficiencies due to employees transferring between units. At the time of the 2004 re-launch of the management system, there were seven corporate standardized processes in place for six of the forty-six expectations. These included processes for project development and execution, operations assurance, repetitive stress injury prevention, road safety management, reliability opportunity identification, emissions/greenhouse gas/energy efficiency process and contractor safety management (10-year OE Strategy).

Further standardization of processes to meet expectations is planned. In the area of environmental management, corporate standardized processes are being developed for property transfer, reporting requirements, environmental impact assessment, and waste management. Within operating companies, a level of organization below the corporate level, additional standardization of processes may take place. For example, within the international exploration and production operating company, standardization of processes are being used to set a basic framework of processes which allow the businesses in diverse locations and regulatory setting to manage risks and impacts in a responsible and uniform manner (10-year OE Strategy).

Because processes can be developed at several levels of the enterprise, the management system requires all OE processes to be designed with a common approach. This approach is called the five-component process approach. The global uniformity of this approach is very important. The design and effectiveness of the processes is the foundation of the management system. For internal auditors of the management system to review the implementation of the management system, a common approach to process design is efficient. Process design and effectiveness gives auditors the best assurance that the unit can identify, develop and continually improve performance to achieve the objectives of the management system. The design and rigor of the processes can vary between businesses due to the risks associated with the unit's operations. Regardless of rigor, each OE process is comprised of the following five components:

- Purpose, Scope and Objectives
- Procedures
- Resources, Roles and Responsibilities

- Measurement and Verification
- Continual Improvement

(Chevron OEMS).

The 'Purpose, Scope and Objectives' section defines the process' boundaries and interfaces with other processes along with the purpose and expected results relative to the OE expectation. The 'Procedures' component describes the steps necessary to be performed and how they are to be accomplished. 'Resources, Roles and Responsibilities' defines ownership of the process - who is responsible to do the work and administer/maintain the process. The 'Measurement and Verification' component confirms that the results are being achieved and the critical components of the process are adequately designed and are being executed. The final component of a process is 'Continual Improvement'. This utilizes measurement and verification results and other input (such as audits) to evaluate how to improve the process and ensure actions are taken to improve process design and effectiveness (Chevron OEMS).

5.2.5 Review and Audit Process

Effective management systems require a structured review or audit process. The Chevron corporate OE review process serves this purpose in the implementation of the Operational Excellence Management System. All business units are reviewed to assess their leadership accountability, management system process and OE expectations. The review process provides independent feedback to the business units and operations on good practices and gaps in their OEMS. It also updates executive management on the status of OEMS implementation around the world-wide enterprise.

There are two types of OE reviews conducted – management system OE reviews and OE focused reviews. The management system OE reviews are generally performed on a three to five year cycle and centered on a business unit level. These reviews assess the organization's ability to meet the requirements of operational excellence including the design and effectiveness of the organizations processes for meeting the OEMS requirements and how they are integrated into the business. There is no overall rating given, but the review looks at leadership accountability, management system process, expectations and processes. The processes are assigned ratings of Good, Satisfactory, and Less Than Satisfactory. Areas of concern are also detailed to identify weaknesses in specific systems, sub-processes or practices that provide significant risk to people, the environment, equipment or the business. Following an OE management system review, the reviewed business unit improves their implementation to closure of all areas of concern and Less Than Satisfactory processes. The focused OE reviews are specific and targeted reviews of facilities or sectors of the enterprise to review specific regulatory compliance issues and other specific internal and external standards (Chevron OEMS).

5.3 Use of ISO 14001 within Chevron Businesses

The OEMS is a mandatory system to be implemented throughout all business units, facilities and operations in Chevron. Regardless of this, some organizations within Chevron have implemented and certified their business in the ISO 14001 standard. Reasons for this vary, but include business drivers relating to competitive pressures, encouragement of local or host governments, or the desire to benefit their businesses prior to the establishment of the OEMS in 2001. Most businesses opting for ISO 14001 certification are discrete plants with

manufactured products and discriminating customers. It is more unusual for oil and gas exploration and production units, who deal with broader property boundaries and commodity energy products rather than manufactured products, to seek this certification. As of midyear 2003, twenty-nine facilities or business operations within Chevron had received ISO 14001 certification (Corporate Responsibility). Consequently, there exists within Chevron considerable experience in implementing and maintaining both the OEMS and the international ISO 14001 standard. Responsible individuals in several of these businesses were surveyed to assess their impressions of operating using the two management systems.

5.3.1 Chevron Global Lubricants

Within the Chevron Global Lubricants business, various locations in Europe and Latin America have received ISO 14001 certification. These locations manufacture, package and distribute lubricant products. Their business drivers for obtaining the ISO 14001 certifications include customer requirements and internal quality aspirations. The certification is being maintained even though the OEMS is also required by the parent corporation, Chevron. The Manager of Operational Excellence for the Global Downstream business stated that the obvious difference between the two systems is the broader scope of the OEMS beyond environmental aspects to include safety, health, reliability and efficiency. However, their experience dealing with auditors makes them feel that the OEMS would generally be well reviewed under the ISO 14001 standard, but additional effort might be needed in the areas of document control and auditing. (Gunderson)

5.3.2 Chevron Oronite

The Chevron Oronite business manufactures chemical fuel and lubricant additives. There are three plants located in France, Japan and Singapore which maintain ISO 14001 certifications. They sought the certifications prior to the advent of the OEMS for the purpose of customer satisfaction and the general business benefits of systematic management of environmental aspects. The certifications are being maintained even though the OEMS has been implemented. Additionally, they have adopted an Integrated Compliance Management System to facilitate management of several different requirements including ISO 14001, OEMS, ISO 9000, and Responsible Care. With all of these programs to manage, the Process Improvement Leader of Oronite stated that there would be perception by an ISO 14001 auditor that the OEMS is sufficient for meeting the ISO standard. He stated that the obvious difference between ISO 14001 and the OEMS is the broader scope. (Nguyen).

5.3.2 Exploration and Production - Asia South Strategic Business Unit

Chevron's hydrocarbon exploration and production business in Thailand is part of the Asia South Business Unit. When Chevron became the designated operator of the producing fields in 1999 an effort to obtain ISO 14001 certification was in progress. The push to get the certification by the predecessor operator was politically motivated as these were being promoted by the host government and being sought by many businesses in the country. The effort to get the certification was initiated in 1999 and granted in 2000. The Chevron HES/OE Manager stated that the certification was given up prior to the implementation of the OEMS in 2001 because value was not added to the business by the certification outside of some outside recognition. At that time, the business was working with the existing environmental policies and work procedures in place within Chevron at that time to manage environmental aspects and risks and soon began implementation of the OEMS. Now that the OEMS is in

place and all the processes and procedures are constructed with the five-component model approach, the business feels that the OEMS fulfils the intent of the ISO 14001 very well. The extra effort in the areas of measurement, verification and continuous improvement are seen as the most important efforts where the OEMS meets or exceeds the ISO 14001 system. (Zapatka)

This business will include some Unocal operations in Thailand when the acquisition of Unocal by Chevron is completed. The Unocal operations are currently ISO 14001 certified and the choice will again be faced to maintain the certifications. The HES/OE Manager feels certain that the OEMS will adequately direct their operations and enables them to meet the objectives of the management system when the operations are fully integrated. A corporate attestation of the OEMS as ISO 14001 compliant would make this decision easier (Zapatka).

5.4 Comparison of Chevron OEMS to ISO 14001

A direct comparison was made of the Chevron Operational Excellence Management System with the international standard ISO 14001:2004 Environmental Management Systems – Requirements with Guidance for Use, to satisfy the primary research objective of this thesis. The basis for the comparison is the brochure Chevron has produced to document the OEMS called Operational Excellence Management System - An Overview of the OEMS (Chevron OEMS). This document, along with the corporate policy which empowers the system (Chevron Policy 530), combines to comprise the system structure that intends to conform to the international standard. The alignment of the OEMS with the ISO 14001 standard is not straightforward. This is mostly due to the fact that the OEMS is established to manage responsibilities, impacts and risks to the corporation relating to safety, health, environment,

reliability and efficiency. This scope exceeds the purpose of the international standard which is limited to the environmental aspects.

To assess the degree of conformance of the OEMS to the ISO 14001 international standard, the specific portions of the standard which constitute requirements were extracted from the standard text. These are phrases that are requirements, or are "shall" statements, and imply that these elements must be present in a conformant system. As stated in section 5.1 of this thesis, there were 59 such statements. Next, the OEMS brochure and the Policy 530 were analyzed to extract components that relate to meeting these requirements. The degree to which the OEMS meets the requirements of the standard is assessed by rating the conformance as:

- Good - the OEMS exceeds the requirements of the ISO 14001 standard or provides a high degree of assurance of alignment
- Satisfactory - areas where the OEMS gives assurance of meeting the standard but may have areas where details are lacking in the documents reviewed
- Less Than Satisfactory - areas where the OEMS does not provide reasonable assurance of conformity with the ISO 14001 standard

Using these criteria, the OEMS was found to meet or exceed the standard in 52 of the 59 requirements. A summary of the comparison ratings is found in Table 3. Gaps of varying significance were identified for seven requirements. The details of side-by-side the comparison of the two systems are found in tabular format in Appendix B.

Table 3. Summary of the side-by-side comparison of the OEMS conformance with the ISO 14001:2004 requirements.

		Comparison Rating – OEMS Compared to the Standard Requirements		
ISO 14001 Section	**Number of Requirements**	**Good**	**Satisfactory**	**Less Than Satisfactory**
4.1 General requirements	2	2		
4.2 Environmental policy	1		1	
4.3.1 Environmental aspects	3	1	2	
4.3.2 Legal and other requirements	2		2	
4.3.3 Objectives, targets and programs	5	1	4	
4.4.1 Resources, roles, responsibility and authority	4		4	
4.4.2 Competence, training and awareness	6		4	2
4.4.3 Communication	4		4	
4.4.4 Documentation	1	1		
4.4.5 Control of documents	3		1	2
4.4.6 Operational control	1		1	
4.4.7 Emergency preparedness and response	4	4		
4.5.1 Monitoring and measurement	3		2	1
4.5.2 Evaluation of compliance	4		4	
4.5.3 Nonconformity, corrective action and preventive action	4		4	
4.5.4 Control of records	3		1	2
4.5.5 Internal audit	4		4	
4.6 Management review	5		5	
TOTALS	**59**	**9**	**43**	**7**

In Appendix B, the six sections of the ISO 14001 system – general requirements, environmental policy, planning, implementation and operation, checking, and management review; containing the requirement statements are stated and the correlative portions of the OEMS addressing the requirements are discussed and the assessed ratings assigned. Requirements earning Less Than Satisfactory or Good ratings are briefly discussed. Following this summary, the components of the OEMS which are not specifically linked to

correlative ISO standard phrases and exceed to requirements of the standard are briefly described.

5.4.1 General Requirements

The ISO 14001 system has two shall statements that simply require the establishment of a management system and that the system be documented and embrace continuous improvement of environmental performance. The OEMS rated Good against both requirements. The rating is supported by the fact that the Policy 503 and OEMS brochure have good alignment and the three general sections of the OEMS, Leadership Accountability, Management System Process and OE elements frame the documentation. Further, the scope of the OEMS is more expansive that the ISO standard to include safety, health, efficiency and reliability.

5.4.2 Environmental Policy

One "shall" statement in this portion of the standard actually contains seven criteria that need to be met in the documentation of the system. These include requirements that the system: be appropriate to the nature and risks of the business; includes a commitment to continual improvement and prevention of pollution; includes a commitment to comply with applicable legal and other related requirements; provides a framework for setting and reviewing environmental objectives and targets; is documented, implemented and maintained; is communicated to all working for the organization; and is available to the public. The Chevron Policy 530 is the corporate policy for health, environment and safety, but it refers to and establishes the OEMS. These documents appear to fully meet the requirements of the standard. One possible weakness was the requirement for this to be available to the public.

These two documents are not accessible on the Chevron external website. However, they have been shared outside the company and are referred to in the external website and are not considered confidential material (Lydeker).

5.4.3 Planning

Of the ten requirements in Section 4.3 of the standard dealing with planning, the OEMS was rated compliant with eight of these. For two requirements, the OEMS was rated as Good compared to standard. There were no requirements for which with the OEMS did not meet the standard. The Management System Process is one of the three main sections of the OEMS. This iterative cycle strongly aligns OEMS with the requirements of ISO 14001. The requirement of the standard in section 4.3.1 for the organization to ensure that significant environmental aspects are accounted for in the management system was rated as Good. This is because the OEMS expands the scope of aspects covered to include safety incidents, health aspects, and asset reliability. The system recognizes that these aspects interrelate and can impact the business and the environment adversely if not attended to. The same exemplary rating was given for the requirement in ISO section 4.3.3 requiring the organization to set up environmental objectives, targets and programs. Justification of the rating comes from the broader scope of OEMS and the interrelatedness of the aspects.

5.4.4 Implementation and Operation

For section 4.4 of the ISO standard dealing with implementation and operation, fourteen of the twenty-three requirements were satisfactorily met by the OEMS. Small deficiencies in the OEMS were found in comparison with the standard for four requirements. Five requirements were found to be exceeded by the OEMS.

Two Less Than Satisfactory ratings came out of requirements within ISO section 4.4.2 dealing with competence, training and awareness. These require records to be retained for employee competence and training be retained. The OEMS brochure fails to address records retention throughout. The expectations within the system do, however, call for documentation of training. Perhaps the level of system documentation found in the brochure leaves the details of documentation to the implementation of the facilities and business units. Another weakness is the fact that the documentation of awareness and training is mentioned most clearly in the Safe Operations element of OEMS and not addressed on a broader level in the Leadership Accountability outside the point that leadership ensures that the entire workforce understands and expects tasks to be performed without incident.

Two Less Than Satisfactory ratings came out of ISO section 4.4.5 dealing with control of documents. The first deficiency is in the requirement that records be controlled in accordance with ISO section 4.5.4. This section will be discussed below. The other deficient rating came from comparison of OEMS with the requirements to have procedures to approve documents prior to issue; review, update and re-approve documents; ensure that changes and revision status are identified; etc. The conformance with this set of clauses is weak for the OEMS documentation level reviewed. Much of this sort of work is left to the implementation of OE processes at the facility or business unit level. In some locations it might be highly evolved and compliant and other perhaps less so. This is an area where location-specific process design and effectiveness review by auditors is very important.

One requirement of ISO found in section 4.4.4 dealing with documentation of the management system was rated Good. This rating is similar to the good ratings for section

4.1 and 4.2 because of the quality of the OEMS brochure, Policy 530, and the OE elements. Additionally, these comprise a system that is broader in scope than strictly environmental aspects as mentioned earlier. All four requirements of ISO section 4.4.7 dealing with emergency preparedness and response were rated Good. These activities are particularly well accounted for in OEMS and seem to be highly evolved within the enterprise. Additionally, the OEMS has the expectation that commitment to quality emergency preparedness programs be spread beyond the enterprise to include affiliates, subsidiaries, joint venture and operating partners and there is an expectation for recovery plans. These features are not required by the ISO 14001 standard.

5.4.5. Checking

Of the eighteen requirements in Section 4.5 of the standard dealing with checking, the OEMS was rated compliant with fourteen of these. For three requirements, the OEMS was rated as Less Than Satisfactory compared to standard. Checking is well addressed in the OEMS through the iterative Management System Process and the corporate OE audit program. These attributes of the OEMS account for the high level of conformance to the standard throughout this section. However, slight deficiencies were found for three requirements, two in 4.5.1 and two in 4.5.4.

A Less Than Satisfactory rating was given for the requirement in ISO section 4.5.1 for the organization to ensure good monitoring data quality and shall maintain records. The OEMS brochure does not address data quality or the maintenance of records.

Ratings against requirements in section 4.5.4 of the standard requires some comment as this section is linked to a deficient rating against ISO section 4.4.5 in the Implementation and Operations clauses. Section 4.5.4 of ISO 14001 deals with control of records and contains three requirements. The first requirement is general in that it requires maintaining records in accordance with the system and the standard. This seems to be adequately addressed in Safe Operations and Management of Change elements of the OEMS dealing with operating and maintenance procedures, process safety information and other process and product activity. The deficiencies are found in the next two ISO requirements calling for procedures for identification, storage, protection retrieval, retention and disposal of records, as well as keeping records legible, identifiable and traceable. These levels of detail are not in the OEMS brochure documentation and the OEMS does not broadly address these subjects. Further, there is no clear distinction between records and documents in the brochure. These details are left to local facilities and business units implementing OE processes to control.

5.4.6 Management Review

The five requirements of ISO 14001 section 4.6 regarding management review were all found to be satisfactorily met by the OEMS. There are two areas where this strong conformance to the standard comes from. First, the Management System Process requires rigorous reviews of the implementation of the system, comparison of performance with targets and objectives and continual adjustments to the plans. Second, there is a rigorous corporate OE review process that performs comprehensive reviews of OE implementation throughout the many businesses and facilities. The results of these reviews are fed upward to the highest management levels of the corporation and also fed back to the units being reviewed.

Two slight areas of concern came when comparing the OEMS brochure with the ISO requirement. The first was regarding the retention of records of management reviews. The OEMS is silent on this point, but this is undoubtedly being addressed in the course of executive meeting minutes. The second involved reconciling the requirement to include input from external communications and complaints. Conformance with this clause is taken from the review portion of the Management System Process that takes into account emerging business issues and changing business conditions. Ideally, this would include law suits, shareholder initiatives, non-governmental organizations concerns and other issues that come to the attention of leadership.

5.4.7 Exemplary Features of OEMS

The Chevron OEMS manages aspects related, not only the environment, but safety, health, reliability and efficiency as well. Consequently, it requires elements and expectations that are not revealed in a side-by-side comparison with the ISO 14001 Environmental Management System. There are six of the thirteen elements in the OEMS that substantially expand the scope of the system beyond ISO 14001. These, in whole or in part, do not show up in the preceding comparison. Each of these extra elements and expectations can impinge on environmental aspects and impacts and are relevant to the successful management the business. The elements and expectations of the OEMS that do not express in the side-by-side comparison are summarized below. The source for this section is the Operational Excellence Management System – An overview of the OEMS brochure. The details of these elements and expectations are further discussed in section 5.5.1 and Appendix B of this thesis.

OE element 1 and all of its expectations did not contribute to the side-by-side comparison with the ISO 14001 system. It deals with the security of personnel and assets to provide a secure environment for the business operations. It requires security awareness of employees and vigilance to security issues. Risk-based security management plans are set up and the plans must be integrated to other emergency management business continuity and information protection measures. (8)

OE element 2 - Facilities Design and Construction, contributed to the comparison with the ISO 14001 system. Two important expectations should be mentioned. This element contains two corporate-wide standardized processes. The first is the Chevron Project Execution and Development Process which directs the manner in which projects are selected and developed. The second standardized process is called Operations Assurance process which considers operability, maintainability, reliability and total life-cycle costs in new or modified facilities. (8)

Element 3 – Safe Operations makes significant contributions to conformance with the international standard regarding communications, awareness, training that bridge safety and environmental management. It also has important expectations for safety and health risk assessments, safe work practices programs, job safety analyses, a repetitive stress injury prevention program, a road safety management program, behavior-based safety, and occupational health programs. The repetitive stress injury prevention and road safety management programs are supported by corporate-wide standardized processes. (8-9)

Element 5 – Reliability and Efficiency is an element with two parts. The reliability portion requires operating and maintaining facilities to sustain mechanical integrity and prevent incidents. This element had direct application to the side-by-side comparison. This element also includes an expectation that includes another corporate-wide standardized process called the Reliability Opportunity Identification process. The efficiency portion of element 5 includes expectations to analyze operational processes to create more efficient use of energy, raw materials and energy. The implications on environmental aspect management of these expectations are apparent. (10)

Element 6 – Third-Party Services addresses contractor conformance to OE. This element contributed to the achievement of ISO 14001 requirements in the area of making sure contractors take on the same obligations to manage aspects in the same manner as employees. This element has an added expectation that is also a corporate-wide standardized process dealing with Contractor Safety Management. This program, established under this element is critical to developing a culture of compliance when the entire workforce, including contractors, is held to high standards. (10-11)

Element 7 – Environmental Stewardship is a critical element of OEMS in the comparison with ISO 14001 requirements and strikes at the very heart of environmental management. Its purpose is to "strive to continually improve environmental performance and reduce impacts from our operations". In addition to the expectations cited in the Appendix A comparison, two additional expectations further contribute to sound environmental stewardship. A process is required to identify potential safety, health and environmental liabilities before property transfers. Another process is required to evaluate, or audit, external waste management

sites before use by the company. These two expectations exceed the requirements of ISO 14001. (11)

5.5 Management Systems of Major Energy Companies

Major energy companies share many of the same environmental, health and safety aspects, risks and impacts. A brief overview of the approaches major international energy companies take regarding management systems for these aspects and their impacts is the subject of this section. Research for these results comes from searching the public websites of the peer energy companies Chevron uses to benchmark operating and financial performance. These companies are British Petroleum (BP), ConocoPhillips, ExxonMobil and Royal Dutch Shell. The public websites make statements regarding each company's use of management systems and give some indication about their level of uniformity in deploying the management systems throughout each enterprise.

Each of the five peer energy companies has chosen to expand their management systems beyond environmental aspects, which is the scope of ISO 14001. The scope of management systems includes safety, health and environment for all the companies and additional aspects for some. There is also some variability between the peer companies in the manner in which they standardize or unify their management system deployment throughout their world-wide businesses. Table 4 shows the general management system approach used by the five peer integrated international energy companies: Chevron, ExxonMobil, Royal Dutch Shell, British Petroleum and ConocoPhillips.

Table 4. Management System approaches of international integrated energy companies.

Energy Enterprise	Management System Scope of Inclusion							
	Environment	Health	Safety	Reliability	Efficiency	Security	Enterprise-wide system uniformity	ISO 14001
Chevron	■	■	■	■	■	as an element	Yes	local option
ExxonMobil	■	■	■			■	Yes	corporate attestation
Royal Dutch Shell	■	■	■				enterprise minimum expectation	units encouraged to follow ISO 14001 or EU Scheme
British Petroleum	■	■	■			To be included in 2005	Yes	required by major operational sites
ConocoPhillips	■	■	■				No	local option

British Petroleum extends their approach to management systems to include health, safety, and environmental aspects. They have a corporate framework for management of these three areas called "Getting HSE Right'. Additionally, environmental management at BP major operations is required to implement the ISO 14001 management system. The details of their "Getting HSE Right" framework are not accessible on their external website, but they do indicate that they do promote their long term goals – "no accidents, no harm to people and no damage to the environment". They state that "Everyone who works for BP, anywhere, is responsible for getting HSE right". By the end of 2004, all major operational sites had achieved ISO 14001 certification through independent auditors. In 2005 they plan to update 'Getting HSE Right' to include security management systems. (BP Management and Compliance)

ConocoPhillips has also chosen to manage health, safety, and environmental aspects of their businesses through a systematic approach. However, there is not a corporate-wide uniform system. Each business unit implements an HSE management system tailored to their specific needs. However, the corporation does have mandatory, issue-specific company health, safety or environmental requirements. Through this approach, some of the ConocoPhillips business units have received ISO 14001 certification for their discrete locations. Their 2002 corporate annual report states that the following are certified to ISO 14001: China Exploration & Production, Hartford, Illinois Lubricants Plant, Humber Refinery in the United Kingdom, and the Sulphur, Louisiana Lubricants Plant (ConocoPhillips 2002 Annual Report 33)

ExxonMobil employs a management system that manages environment, health, safety and security throughout their world-wide operations in a standardized system called the Operational Integrity Management System (OIMS). ExxonMobil displays extensive information regarding the documentation of this system on their external website. Their transparency in this regard is greater than all the peer energy companies reviewed, including Chevron. The OIMS framework is comprised of eleven elements with underlying principles and expectations. (ExxonMobil OIMS). The website availability of OIMS documentation allows close comparison with the Chevron Operational Excellence Management System. This comparison is detailed in section 5.5.1.

The maturity of the deployment of the ExxonMobil system is apparent by reviewing the external website and it is possible that they were employing a management system with some success before the advent of ISO 14001 in 1996. Soon after ISO 14001 was

established, ExxonMobil self-certified that the management system was compliant with the standard. In 1998 and again in 2001, they received an external attestation. This process confirmed that the system met the requirements of ISO 14001 and was implemented across the company. (Exxon Lloyd's)

Royal Dutch Shell does not espouse a corporate-wide management system approach according to its external website. They describe their organization as a "decentralized, diverse group of companies with widespread activities and each Shell company has wide freedom of action" (Shell Business). Their policy regarding environment, health, and safety states that every Shell company has a systematic approach to HSE management to ensure compliance with the law and to achieve continuous performance improvement (Shell HSE Policy). The specific documentation for ISO 14001 or other system use for each business unit is considered proprietary (Brown).

Royal Dutch Shell does state minimum performance standards regarding the environment. These cover minimum expectations for their businesses in eleven areas – external certification, external verification, CFCs/Halon, continuous flaring & venting, SOx/NOx/oil in water, chemical discharges, produced water, oil-based muds, groundwater monitoring, safety data sheets, and incident reporting/investigation. Their units and facilities are encouraged to implement a standardized system such as ISO 14001 regarding the environment component of HSE management. In so doing they state, units "are encouraged to have their environmental management systems certified against recognized, independent system standards, such as ISO 14001 or the European Union's Eco-Management and Audit Scheme" (Shell Minimum Standards).

5.5.1 Comparison of Chevron's OEMS with ExxonMobil's OIMS

Among Chevron's peer energy companies, ExxonMobil appears to have a management system of comparable scope and design. It also has a publicly available documentation brochure comparable to the Chevron Operational Excellence Management System – An Overview of the OEMS brochure. The ExxonMobil system is entitled Operations Integrity Management System or OIMS. The similarities between OEMS and OIMS are extensive. In fact, both system documentation brochures begin with a message from the CEO of the respective company and an image of the leader to underscore that these systems are important to their respective enterprises and reflect the core values of these leaders. (Chevron OEMS and ExxonMobil OIMS)

5.5.1.1 General Comparisons

Superficially, the two brochures describe management systems that are remarkably similar in scope and organization. The stated scope of the OIMS is safety, health, environment and security. Additionally, by its very title – 'Operations Integrity' - reliable and efficient operations are strongly implied as within the scope (2). These intents resemble the scope of the Chevron OEMS (1).

Overall, the Chevron brochure is more lengthy, numbering over 16 pages. The ExxonMobil brochure is 12 pages. Much of the content in the Chevron brochure is documentation on the management system, background on the corporate vision and values, objectives of the management system, and extensive information on the three main parts of the system – Leadership Accountability, the Management System Process and the OE expectations. Some of the same information regarding the ExxonMobil OIMS is embedded in the information within their presentation of their eleven OIMS elements. The ExxonMobil OIMS

addresses of the intent of Chevron's Leadership Accountability component concisely in their element 1 – Management Leadership, Commitment and Accountability. The cyclical and iterative Management System Process – Vision & Objectives, Assessment, Planning, Implementation, Review - described at length in the Chevron brochure, is covered in ExxonMobil's element 11 – Operations Integrity Assessment and Improvement. (Chevron OEMS and ExxonMobil OIMS).

5.5.1.2 Elements and Expectations

The bulk of both brochures are dedicated to the elements and expectations. Both companies have used these two terms to describe the core requirements of their management systems. ExxonMobil utilizes eleven OIMS elements. Each element has a brief underlying principle and a number of expectations that a process, procedure or system deployed by an ExxonMobil operation must fulfill to satisfy the expectation (3). Within the eleven elements, there are 64 expectations. Chevron OEMS uses thirteen elements and 46 OE expectations. The Chevron OEMS elements also include a concise statement of the element's intent, followed by one or more expectations which must be met by processes put in place by local management (Chevron OEMS). The specific language of the ExxonMobil elements and expectations can be seen in Appendix C. The Chevron elements and expectations are in Appendix A.

ExxonMobil has employed more expectations than Chevron. In so doing, ExxonMobil has included some of the similar content included in Chevron's Leadership Accountability and Management System Process. This allows a side-by-side comparison of the OEMS to the OIMS elements and expectations. This comparison is shown in tabular form in Appendix C.

The comparison of the OIMS elements and expectations to the content of the OEMS brochure shows a strong comparability. There are areas where the OIMS expectations are more detailed than the OEMS documentation, and areas where the OEMS is mute where the OIMS provides an expectation (Chevron OEMS and ExxonMobil OIMS).

OIMS element 1 includes a very interesting expectation 1.10 that has no OEMS counterpart. It calls for Managers responsible for businesses Operated by Others (OBO) to communicate OIMS principles to the Operator and encourage the adoption of OIMS or similar systems. This requirement raises a very interesting issue regarding confirmation that the expectation is met. It is uncertain how this expectation is fulfilled to the satisfaction of an internal auditor.

The ExxonMobil OIMS has an element dealing with Risk Assessment and Management – element 2 (5). There is no direct correlative element in the OEMS with this amount of focus in the use of risk assessments for managing the business. In comparison, the Chevron OEMS requires risk assessments in seven of its thirteen elements (Chevron OEMS 8-13). The side-by-side comparison shows four discrete OIMS expectations regarding risk assessment that are not addressed in detail in the OEMS. These deal with the qualifications of risk assessors, update intervals of risk assessment, documentation of risk-based decisions and follow-up procedures on risk-management decisions.

Within OIMS element 6 - Operations & Maintenance, several expectations are not addressed to a comparable level of detail in OEMS. The first deals with managing temporarily disarming of alarms, controls, etc. The second deals with interfaces between various operations to manage risks (7). Both of these items seem to be intending to manage activity

to a greater level of detail than generally addressed in OEMS. Also within OIMS element 6 is a requirement to have a materials and facility quality-assurance process. This has no correlative in OEMS. Another area covered well by the OIMS is the process to address long-term shutdown or abandonment. Chevron addresses this within element 2 dealing with facility design and construction, specifically expectation 2.4 (8). This expectation calls for a pre-startup review on new, modified and long-term idle facilities. Additional consideration but some consideration to this issue is given in the OEMS property transfer expectation 7.3 (11).

Element 7 in OIMS (7) and element 4 in OEMS (10) share the same name – Management of Change. The purpose of both elements seems consistent, yet the ExxonMobil underlying principle and expectations contain more detail than the Chevron approach. The disparity in the level of detail results in several item in OIMS left unaddressed in the OEMS: analysis of Operations Integrity implications; compliance with regulations and approved standards; acquisition of needed permits; time limitations of temporary changes; temporary changes exceeding initial authorization for scope or time require review and approval. Only the two points about regulatory compliance and permit requirements seem particularly noteworthy.

Two gaps in comparability are considered irrelevant because they refer to components of ExxonMobil's organization that do not align with Chevron's structure. One concerns the role of their Legal Department in their Incident Investigation and Analysis element (8). Chevron has not canonized the role of any individual department in the process of investigations and chooses to install multi-functional teams as required for any particular investigation. Legal may or may not have a role. The other expectation is in OIMS element 5 – Personnel and Training. ExxonMobil has chosen to include in their management system expectation

number 5.4, which deals with employee performance appraisals (6). Chevron's process is adequately rigorous, but it is left outside the management system and placed within human resources programs and performance management processes.

5.5.1.3 OI/OE Process or Procedure Design

One area of uncanny comparability in the brochures is the descriptions of the requirements for a process or procedure intending to satisfy expectations in either system. Chevron calls this 'The Process Approach' or the five-component model. This describes the common design elements of an OE Process. These five-components of an OE Process are: Purpose, Scope and Objectives; Procedures; Resources, Roles and Responsibilities; Measurement and Verification; Continual Improvement (9). The ExxonMobil OIMS covers the same intent in what it calls 'The Characteristics of Management Systems'. Use of the term 'Management System' is a little confusing since the over-arching management system approach uses the same two words. Regardless, the purpose is the same; to describe the design of a program put in place by operating units to address expectations. ExxonMobil also describes five components: Scope and Objectives; Processes and Procedures; Responsible and Accountable Resources; Verification and Measurement; Feedback and Improvement Mechanisms (10). The comparability to these two features of the management systems is nearly identical.

5.5.1.4 Management System Reviews

Both brochures describe the process whereby the entire Management System is reviewed on a business unit and corporate level. Again, the level of comparability is quite remarkable. Corporate level reviews are considered external to the reviewed units and are different and

supplemental to those performed within a business unit. In the Chevron system the internal audit is covered in the Review step in the Management System Process (7). Internal reviews in the ExxonMobil system are addressed in OIMS element 11 - Operations Integrity Assessment and Improvement (9). These internal assessment processes supplement the corporate level audits. Both brochures give a full page of documentation on the corporate level reviews. Table 5 shows the comparison of the basic organization of the two corporate system reviews.

Table 5. Comparison of the corporate management system reviews for the ExxonMobil OIMS (11) and the Chevron OEMS (16).

Parameter	ExxonMobil OIMS Evaluation	Chevron OE Review Process
Scope or Content	• System Status - examines the five characteristics of the processes and their documentation, deployment – communication, training, measures, verification, feedback • System Effectiveness - Conformance to the overall system, execution, are objectives achieved	• Ability of the organizations ability to meet OE • Process design (five-component model) • Effectiveness of OE processes – compared to objectives and measures • Integration into the business
Frequency	• External assessments each 3 to 5 years based on risk • Supplemented by annual internal assessments (element 11) in intervening years	• 3 to 5 year – three years for operations and five-years for lower risk office-based • Supplemented by annual review under the Management System Process
Ratings	• Status and Effectiveness rated from 1 through 4 (4 highest) • Each system (=process) is given an integrated rating of the two • Operating Unit have an average of all the System ratings as an overall rating	• The Design and Effectiveness of each Process is given a rating of Good, Satisfactory or Less Than Satisfactory • Additional feed back on Areas of Concern regarding systems, sub-processes, risks to people, environment, equipment or the business • No Overall Rating

There is an additional type of review described in the Chevron Brochure. This is called and OE Focused Review. They supplement the other OE reviews and are designed to be variable is scope and target compliance with regulations and other internal or external

standards. These are triggered by a request from an operating unit or lagging performance in a specific area against set objectives. They are typically at a facility level or they may be based on a specific topic, or across facility boundaries (16).

6.0 Analysis and Discussion

The purpose of this analysis and discussion of the results in this thesis is to understand findings of the studies in comparison with the primary and secondary research objectives. The most critical analysis involves the assessment of the Operational Excellence Management System and its degree of conformance with the requirements of the ISO 14001 international standard for environmental management systems. Additionally, the areas where the OEMS provides additional benefits are noted. The secondary objective is a review of management system approaches of peer energy companies, particularly, the comparison of the OEMS to the ExxonMobil Operations Integrity Management System.

6.1 Is the Chevron OEMS Compliant with ISO 14001?

As reported in the Results section 5 of this thesis, there is strong degree of comparability, and likely conformance between the OEMS and the ISO standard. There are 52 of the 59 requirements of the standard where the OEMS either meets or exceeds the standard. It is unlikely that the remaining seven requirements constitute enough concern to prevent an external auditor of the system to withhold certification. The Chevron Corporation 2004 Corporate Responsibility Report disclosed that an assessment is underway to determine the alignment of the OEMS with the ISO 14001 international standard for environmental management (4). Until a series of ISO 14001 review visits are performed at Chevron businesses, it can't be assured that the system conforms to the standard. However, based on the results of the investigations in this thesis, there is a strong likelihood that the OEMS conforms with the requirements of the standard.

To gain insight into the question of OEMS conformance with ISO 14001, leaders within Chevron who have had experience certifying their environmental management systems to the ISO 14001 standard and with implementation of the OEMS System were interviewed. All the respondents were asked this question, "Do you think an auditor for ISO 14001 would find the OEMS sufficient for ISO 14001?" Each of them answered in the affirmative. Gunderson, whose experience comes from the Chevron Global Lubricants businesses, elaborated by stating that some supplemental effort might be necessary in the areas of document control and auditing. Nguyen believed that the OEMS would be sufficient for ISO 14001 accreditation. These favorable comments concur with the findings of this research. However, the concerns raised by Gunderson about gaps in document control and auditing coincide with concerns revealed in this research and will be discussed following sections.

6.1.1 Documents, records and their control

The first instance where the OEMS might be lacking in comparison with the ISO standard with regard to records is in ISO section 4.4.2 dealing with employee competence, training and awareness. Specifically, the standard requires records of employee competence be retained and records of employee training be retained. This level of detail is lacking in the OEMS documentation brochure. Such a level of detail is probably left to local business implementation or within the human resources records of any employee. Ideally, this requirement would be part of an OE expectation within the OEMS. The closest the OEMS brochure comes to addressing this is within the Safe Operations element and expectation 3.6. This requires that training effectiveness be assessed and documented and it does not use the term competence. It cannot be concluded that documented fulfills the retention

requirement. A second reference to training is within the OE element on Management of Change expectation 4.1.

Potential shortfalls of the OEMS were identified in ISO standard section 4.4.5. There is one requirement calling for records to be controlled in accordance with section 4.5.4. This referred section was given a Less Than Satisfactory rating and consequently the same was given in 4.4.5. A second requirement in 4.4.5 requires procedures be in place to manage a series of aspects regarding control of documents. These include: approve documents prior to issue; review, update and re-approve documents; ensure that changes and revision status are identified; relevant versions are available at the points of use; documents are legible and identifiable; pertinent external documents required by the system are identified and controlled; and obsolete documents are identified and protected from unintentional use. Descriptions of this level of document control procedures is lacking in the OEMS documentation brochure. This is probably due to the fact that these procedures are left to the businesses to design and implement. A more standardized approach could enhance the OEMS, particularly setting standards for identifying revisions that are valid versus obsolete versions.

Another concern regarding records was identified in ISO 14001 section 4.5.1, which deals with monitoring records of key characteristics that have significant environmental impact. These records need to be of high quality and be retained. The OEMS brochure does not address data quality or the retention of the records. Again, this is probably a detail left to local business implementation where the environmental impacts are identified, understood and monitored. There is extensive effort at each local business to monitor events and

performance to track OE performance in areas of safety performance, spill management, waste and other discharges, lost profit opportunities, enforcement actions, etc. This sort of recordkeeping will probably and should evolve into a corporate standardized process.

ISO 14001 section 4.5.4 referred to above was the source of two Less Than Satisfactory ratings dealing with controlling records in a similar manner as in 4.4.5. There must be a procedure for identification, storage, protection, retrieval and disposal of records. The records must remain legible, identifiable and traceable. As mentioned above relating to section 4.4.5, the OEMS brochure does not specifically or broadly address records identification, storage, protection, retrieval, retention and disposal. It is also lacking direction on legibility, identifiably and traceability. Some guidance is given only in the Safe Operations and Management of Change elements and expectations. These could be made broader and embrace records generated to for all processes. Further, no clear distinction is made between records and documents. These details are probably left to local control and implementation.

With several Less Than Satisfactory ratings clustered within the areas of records and documents management, there was concern that this area might be a major shortfall of the OEMS. However, in most cases, the issues relating to the management of records and documents are managed and documented at a local level. This scale of review is beyond the purview of this thesis. To gain insight to the degree to which these topics would preclude the OEMS being certified as equivalent to the ISO 14001 systems, a comparison with a management system already attested as equivalent was necessary. The ExxonMobil OIMS provided a good exemplar for this comparison. ExxonMobil has had more years of

experience dealing with their management system and have sustained corporate-wide attestation that is equivalent to ISO 14001 since 1998. This fact indicates that their businesses have taken the expectations of the system and applied them to a level that meets the standards set by the external auditors. Can the same level of document and records management be expected from implementation of the OEMS elements and expectations?

To assess this concern, the ExxonMobil OIMS elements four and five were carefully examined. OIMS element 4 deals with Information/Documentation and element 5 deals with Personnel and Training. It appears that ExxonMobil has organized these elements specifically with ISO 14001 attestation in mind. They are the exact areas in which the standard has focused its requirements for records and documents management. ExxonMobil's wisdom and efficiency in grouping the expectations for record and document management so concisely is validated by their successful attestation reviews. Chevron has scattered the treatment of document and record management through four different elements, as well as the Leadership Accountability documentation. While perhaps not as efficient or concise as the ExxonMobil approach, the degree of comparison shown in Appendix C is considerable. The direct comparison of the five expectations in OIMS element 4 to the OEMS shows the correlative focus areas in OEMS within expectations 3.4, 3.2 – HAZCOM, 8.1, 12.1 and 4.1. This comparability with the OIMS, an externally attested ISO 14001 compliance system, should give great confidence to Chevron. When properly implemented and matured at business units, the OEMS would not be found lacking regarding record and document management.

6.1.2 Reviews and auditing

A concern was mentioned by Gunderson regarding reviews and audits within OEMS. He stated that reviews and audits under OEMS might require supplemental effort for a successful ISO 14001 audit. He didn't state specifics, but analysis of this issue has revealed one potential gap. Audits and reviews are addressed in ISO 14001 4.5.5 – Internal reviews and 4.6 – Management review. The OEMS is conformant in all areas regarding the internal reviews of the management system though its documentation of the Management System process and the Corporate OE Reviews. However, among the requirements for management review are: results of internal audits and reviews of legal and other requirements; external communications and complaints; environmental performance measures; review of objectives and targets; status of corrective and preventive actions; results of prior management reviews; changing legal or other requirements; and suggestions for improvements. The OEMS brochure tends to focus the review process on the implementation of the management system itself, progress against world-class performance measures, implementation of planned actions and identifying opportunities to adjust business plans. The possible gap is in the area of compliance assurance with legal requirements. This is not a stated objective of the OE review either internally or on the corporate level, except for an OE Focused Review. It is likely that compliance is an area getting great attention through the implementation of element 12 at the business level. This element calls for units to "verify conformance with company policy and government regulations." (Chevron OEMS 13) Stating that the OE review process is inclusive of legal and regulatory compliance would eliminate any gap.

6.1.3 Lingering concerns

Within the analysis of the OEMS against the ISO 14001 standard there were a few fine points of concern. These points did not lower the assigned rating from the Satisfactory level, but they do warrant mentioning.

The ISO System section 4.4.3 deals with communications. The OEMS documentation seems to cover the requirement for communication of the system itself within the business quite well and holds extensive assurances that the workforce is informed and aligned around the system objectives. There is a portion of the requirement that calls for receiving, documenting and responding to relevant external communications. Documentation of the OEMS most clearly addresses external communications within the context of product stewardship, safe operations and community outreach. This may be all that is relevant, but it is uncertain how an ISO 14001 auditor would view this approach and whether there are processes to document and respond to external communications.

The ISO System section 4.5.3 deals with nonconformities. The OEMS is very strong in establishing the management of incidents - their prevention, investigation and corrective actions. These measures are featured in the Leadership Accountability documentation and in the element dealing with incident investigation. Incidents are not defined by the OEMS documentation, but generally include uncontrolled releases, safety incidents, motor vehicle crashes, lost profit opportunities, near misses, fines and penalties. The standard defines nonconformity as non-fulfillment of a requirement (ISO 14001:2004). Requirements are legal or other performance objectives set up by the management system. Because legal regulatory compliance is fundamental to this definition of nonconformity, it would be ideal if the OEMS element dealing with incident investigation included legal compliance issues. The

OEMS does include an element 12 dealing with Compliance Assurance. This strengthens the systems conformance to the standard, but this element contains no expectation for investigations or corrective actions beyond a self-audit process.

6.1.4 Above and Beyond the Standard

It is readily apparent that the Chevron Operational Excellence Management System exceeds the ISO 14001 standard in many areas merely by its scope. Besides environmental aspects, the scope includes aspects related to safety, health, reliability and efficiency. This inclusive approach recognizes that environmental aspects are not best managed in isolation from the other aspects. Improved performance in any area; whether health, safety, reliability or efficiency; tends to benefit environmental performance. They are all interrelated and a business can benefit from good management of all of these aspects. This scope range of the OEMS earned ratings of Good compared to the standard for five requirements in ISO section 4.1, 4.3.1, 4.3.3 and 4.4.4.

Another area of exemplary ratings of the OEMS is in the management of emergency preparedness and response, ISO section 4.4.7. All four requirements earned Good ratings because there is good alignment of the OEMS brochure documentation with the standard and these processes are especially well implemented corporate-wide. One feature of the OEMS is the expectation 11.4 for a business recovery plan which is not addressed in the standard. This element of emergency management is above and beyond the requirements of the standard.

6.2 Is the Chevron OEMS Comparable to Peer Energy Company Management Systems?

All of the major international energy companies identified in Chevron's peer group have chosen to manage aspects beyond just environmental in their management systems. At a minimum, each has chosen to collectively manage through a systematic approach; health, environment and safety aspects of their business. The comparison of the systems of each is presented in Table 4. Royal Dutch Shell has taken a decentralized approach encouraging major businesses to maintain ISO 14001 certification and setting enterprise-wide minimum expectations in key areas of risk. British Petroleum has set an enterprise-wide uniform system and requires all of their major sites to maintain ISO 14001 certifications. However, the documentation of the uniform management system was not available externally. ConocoPhillips has not established a corporate management system and leaves the choice of seeking ISO 14001 certification to their business units. Chevron has established a corporate management system, the OEMS, and the choice to seek ISO 14001 certification is a local business decision. A corporate-wide ISO 14001 attestation effort is being developed. ExxonMobil has established a corporate management system, the Operations Integrity Management System. ExxonMobil also has maintained a corporate-wide ISO 14001 attestation since 1998. The documentation of the management system and the attestation is proudly shown on their corporate website. Based on these conditions, ExxonMobil has set the standard among the major international energy companies for management systems. Chevron is apparently taking a similar approach as ExxonMobil, with a later starting date.

The greatest concerns regarding the conformance of the Chevron OEMS with the ISO 14001 system lies in its implementation uniformity corporation-wide and its maturity. These concerns would have consequences during pursuit of a corporate-wide attestation of the

system's conformance with ISO 14001, as ExxonMobil has achieved. The OEMS brochure has done an excellent job of defining the system's components; however, the actual deployment at businesses is the proof of the system's value. Chevron has had its OEMS since 2001 and has stated a 10-year plan for its full implementation. It is probable that an ISO 14001 auditor could find business entities within Chevron's global units that have implemented and matured their management system to a level that is compliant with the standard before the 2006 to 2010 timeframe. Other units may not reach this level of implementation until the end of the 10-year period, or beyond.

The ISO 14001 environmental management system is ideally suited to a discrete location or business organization with specific boundaries, manufactured products and services. Extrapolating the system to a global enterprise with a variety of businesses, commodity products, and services is a great expansion of its in span. Seeking and maintaining an ISO 14001 corporate-wide attestation is a very high achievement. ExxonMobil has matured its system and implemented it uniformly throughout its enormous business.

6.3 Suggestions for Strengthening the OEMS

As Chevron matures its implementation of the OEMS, a few opportunities to strengthen the system and its documentation are apparent. The first opportunity is in the area of enhancing the transparency and visibility of its approach to the management system.

The Chevron EHS Policy 530 is the empowering document that establishes the management system. This policy is not accessible on the company corporate website and its most recent update version is dated 2001. The policy is mentioned and quoted in part on externally available documents. Placing this policy on the external website along with the OEMS

brochure would enhance the image of the system and benefit the company. This level of transparency would match the level of ExxonMobil and exceed the other peer companies.

Other measures to strengthen the OEMS have been mentioned throughout the text of this thesis and its appendices. These areas constitute areas where the OEMS brochure does not ensure that the requirements of the ISO 14001 are met due to omission, lack of detail, or deferring required detailed implementation to local businesses. These are mentioned briefly as follows:

- Post the OEMS brochure and Policy 530 on the external website
- Document the competence of employees and the retention of records through reference to the human resources processes and the performance management process
- Clearly state within the documentation or element 3, 7, 8, 10 and 12 the types of external communication which are considered relevant to the corporation and ensure they are received, documented and responded
- Develop and mature a set of corporate-guidelines for document control for OE related documents
- Establish an expectation within element 12 to identify relevant monitoring requirements and ensure quality data is retained
- Develop and mature a set of corporate-guidelines for records control for OE relevant records
- Amend element 9 to include non-compliance incidents within scope of incident investigation activities to align this element with the ISO requirement to investigate and follow-up on non-conformities

- Amend expectation 12.2 to include compliance with permit conditions within the purview of the self-audit process and that any findings are investigated and resolved
- Within element 4 – Management of Change, include an expectation to address risks of long-term shutdown or abandonment of operations
- Within element 4 – Management of Change, include considerations of regulatory or legal compliance and permit implications

7.0 Conclusions

This thesis has investigated the primary research objective of assessing the conformance of the Chevron Operational Excellence Management System with the ISO 14001 standard for environmental management systems. To make this assessment, the text of the standard was reviewed to identify statements in the text that constitute requirements. The OEMS and the corporate Environmental, Health and Safety Policy which empowers the management system were reviewed to identify its components, structure and other documentation. The requirements of the standard were then compared with the features of the Chevron OEMS as documented in its brochure and its standing corporate policy to assess the degree of conformance. A supplemental investigation of the conformance of the OEMS to the standard was made by interviewing leaders within Chevron who have had experience with both the ISO 14001 standard and the OEMS.

The secondary research objective was to review several peer international energy companies for their approaches to managing environmental and related aspects of their operations in a systematic manner. This review surveyed the external websites of these companies and summarized the scope and uniformity of their application of management systems. All the peer companies affirmed the use of a systematic approach and all expanded the scope of their systems more broadly that just environmental aspects to include health, safety and other aspects. This expanded scope exceeds the intent of the international standard, which is limited to management of environmental aspects. One company, ExxonMobil, provided considerable documentation of its system on its website. A comparison of the ExxonMobil system and the Chevron OEMS was performed.

All of the peer international energy companies surveyed have recognized the importance of managing environmental and other aspects though a systematic approach. The degree of centralization and uniformity used by these companies varies. ExxonMobil has shown that the system they have deployed has been uniformly implemented throughout their world-wide businesses and that the system itself is equivalent to the ISO 14001 standard through an external attestation. The documentation of the ExxonMobil system, in comparison with the Chevron system indicates a likelihood that Chevron can expect similar conformance of the OEMS should an external attestation be sought.

As Chevron is still in the implementation and maturation of their system, the opportunity is present to adjust some of the features and requirements of the system to strengthen and align more fully with the standard. These opportunities have been summarized in this thesis. The results reported in this thesis affirm the management system approach employed by Chevron is likely capable of achieving the intent of ISO 14001.

Until a series of ISO 14001 review visits are performed at Chevron businesses, it can't be assured that the system conforms to the standard. However, based on the results of the investigations in this thesis, Chevron's Operational Excellence Management System approach is comparable to its peers and conforms well to the ISO international standard.

Through the use of management systems to integrate environmental, health, safety and other critical issues into their business processes, major companies in the energy industry are gaining higher levels of performance. They have applied elements of the international standard of practice for environmental management systems laid out in ISO 14001 and

extended them to include the additional issues related to health, safety and other important issues. This systematic management approach expresses the importance of these issues to these companies to ensure that their performance continuously improves. The efforts extended through installing the management systems produces greater assurance of operational excellence that serves to sustain these businesses and assure internal and external stakeholders that the issues are being attended to in a responsible manner.

7.1 Recommendations for Further Study

The conclusions drawn from the analysis incite ideas about other investigations regarding management system use in the energy industry.

Broadening the range of energy companies reviewed would be an interesting investigation. As all energy companies share similar risks and responsibilities, regardless of size, it would be interesting to determine the approaches to compliance assurance or use of management systems in smaller energy companies and nationalized companies.

Within Chevron's application of the management system, it would be interesting to review the results of Chevron Corporate OE Reviews reports to extract the nature of findings to note whether they reveal shortcomings in businesses relative to the requirements of the ISO 14001 standard.

The approach to management systems employed by nationalized energy companies and their business drivers for doing so is also of interest. National energy companies are not accountable to shareholders and the public in the same manner as the major international

energy companies that issue publicly traded stock. These are accountabilities are often drivers for implementing management systems. National energy companies in developing nations might promote use of management systems by companies they host as operators in their countries as the use of such systems would provide the host public greater assurances of good management of environmental aspects and impacts. Often, the national companies partner with international energy companies and acquire best-practices from them. Environmental management systems and practices are among these technology transfers. For example, the management system being installed on Kuwait's upstream energy business is based on input from British Petroleum (Al-Gharabally). The parent petroleum company in Kuwait with integrated energy operations as its scope is taking management system advice from DuPont (Al-Shatti). As these systems mature, an investigation into this national company and others would be of interest.

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Appendices

Appendix A.

Chevron Operational Excellence Management System Elements and Expectations (Chevron OEMS).

Operational Excellence Element	OE Expectation
Element 1 – Security of Personnel and Assets *Provide a secure environment in which business operations may be successfully conducted.*	1.1 A process is in place to ensure employees are actively engaged in security awareness and vigilant to the security environment.
	1.2 Risk-based security management plans are developed, implemented and maintained to address potential security threats to the business.
	1.3 A process is in place to ensure security management plans are integrated with related plans for emergency management, business continuity and information protection.
Element 2 – Facilities Design and Construction *Design and construct facilities to prevent injury, illness and incidents and to operate reliably, efficiently and in an environmentally sound manner.*	2.1 The Chevron Project Development and Execution Process (CPDEP) is used to incorporate safety, health, and environmental requirements, considerations and practices in the planning, design and construction of new or modified facilities.
	2.2 Incorporate design for reliability into new and modified facilities using the Operations Assurance process in CPDEP. Consider operability, maintainability, reliability and total life-cycle cost in the planning, design and construction of new or modified facilities.
	2.3 A process is in place to comprehensively assess safety, health and environmental risks and impacts for new and modified facilities and develop plans to mitigate significant risks and impacts. Assessments conducted in early project phases shall be re-evaluated during final detailed design to ensure identified risks and impacts are mitigated as part of ongoing operations.
	2.4 Conduct pre-startup reviews on all new and modified facilities prior to operation and after shutdowns or restarting idle facilities to confirm that they meet applicable requirements.
Element 3 – Safe Operations *Operate and maintain facilities to prevent injuries, illness and incidents.*	3.1 A risk-assessment process is in place to periodically identify, assess and mitigate the safety and health risks related to facility operations and modifications.
	3.2 A comprehensive safety program is in place for each location. Core elements of the program shall include: • Written safe work practices (permitting, lockout-tagout, etc.) for identified hazards • A written job/task safety analysis (JSA) to identify, eliminate or mitigate potential risks prior to conducting work • A repetitive stress injury (RSI) prevention program • A comprehensive road safety management program to minimize risk and promote motor vehicle safety • A hazardous materials communication (HAZCOM) program to manage and communicate hazards • A behavior-based safety program to provide for observation and commentary on worker behaviors, tracking and analysis of observations, and a process for identifying and implementing actions for improvement
	3.3 An occupational health program is in place for each location. Core elements of the program shall include: • Industrial hygiene and medical surveillance programs appropriate for the location that include procedures for identification and control of workplace exposures, on-going monitoring and surveillance of

Operational Excellence Element	OE Expectation
	affected personnel • A process to ensure that employees are physically fit for their work tasks • A process is in place to confirm that personnel in HES-sensitive jobs are fit for duty and are not compromised by drug or alcohol abuse or other observable psychological disorders (e.g., depression, anxiety)
	3.4 A process is in place to ensure that operating and maintenance procedures, process safety information and other information are developed and maintained. The process shall ensure that documents, procedures, records and other information are current and accessible. Procedures for document control including confidentiality and retention shall also be included.
	3.5 A training program is in place to ensure that employees have the skills and knowledge to perform their jobs competently, in an incident-free manner and in compliance with all applicable laws, regulations, company policies, and requirements. The program shall include: • Identification of training needs for leaders, supervisors and other employees • Initial, ongoing and regular refresher training • Documentation and assessment of training effectiveness
	3.6 A job-selection process is in place to fill defined HES-sensitive jobs. This process shall ensure that individuals selected have the knowledge, skills, performance history, abilities, and demonstrated behaviors to conduct their activities in an incident-free manner, in compliance with applicable laws, regulations, company policies and requirements.
Element 4 – Management of Change Manage both permanent and temporary changes to prevent incidents.	4.1 A process is in place to manage changes to facilities, operations, products or the organization. The management of change process shall address: • Both permanent and temporary changes • Authority for approving changes • Evaluation of health and safety hazards, environmental impacts and mitigation • Communication of the change • Training
Element 5 – Reliability and Efficiency **Reliability:** *Operate and maintain facilities to sustain mechanical integrity and prevent incidents.* **Efficiency:** *Maximize efficiency of operations and conserve natural resources.*	5.1 The Reliability Opportunity Identification (ROI) process is in place to identify and resolve the significant few design, equipment, work process and/or human reliability opportunities that cause significant incidents or performance gaps. Failure analysis is used to determine causes of failures and actions are taken to resolves these causes.
	5.2 A process is in place to identify critical structures, equipment and work processes by assessing possible failure modes and consequences.
	5.3 A process is in place to establish and use a standardized set of equipment operations and surveillance duties and readings for all critical structures, equipment and protection devices to ensure they operate properly. Standardized work process indicators shall be established for identified critical work processes to ensure they are carried out effectively.
	5.4 A documented program for condition monitoring (time-based inspection and testing) is in place to monitor and ensure mechanical integrity of all critical structures, equipment and protection devices.
	5.5 A process is in place to plan, schedule and complete necessary maintenance for all structures, equipment and protective devices. Process shall include: • use of surveillance and condition monitoring results for all critical

Operational Excellence Element	OE Expectation
	structures, equipment and protective devices to proactively manage repairs • a structured, project planning approach for facility shut-ins, turnarounds and significant maintenance projects to reduce downtime and ensure efficient use of resources • routine planning and scheduling for non-critical equipment as appropriate
	5.6 A process is in place to identify and resolve other repetitive or recurring failures not addressed by the ROI process, to improve reliability and reduce maintenance costs.
	5.7 A process is in place to analyze operational processes and improve profitability through the efficient use of people, time, and assets.
	5.8 A process is in place to track and improve energy efficiency while reducing emissions (including greenhouse gases) per unit of production.
	5.9 A process is in place to maintain inventories and plans for conservation of natural resources and for reducing use of raw materials by each facility and each process.
Element 6 – Third-party Services *Systematically address and manage contractor conformance to Operational Excellence*	6.1 A process is in place to ensure that third-party service suppliers perform to safety, health, environment and reliability requirements consistent with those required of company employees when working on company property and when providing services for the company off company property.
	6.2 A Contractor Safety Management (CSM) program is in place that clearly establishes accountabilities and includes engagement of contractors and written contractor safety management processes. The program shall include: • identification of company contract "owners" (or management sponsors) accountable for each contract • active engagement of contractors in implementing and improving the CSM program • a contractor qualification and selection process which addresses safety performance • periodic evaluation of contractor safety performance and assessment of the CSM program
Element 7 – Environmental Stewardship *Strive to continually improve environmental performance and reduce impacts from our operations.*	7.1 A process is in place to inventory all emissions, releases and wastes and to identify natural resources impacted by operations. (Natural resources include air, surface water, ground water, soil and geologic resources, and local biological diversity.) The inventory should include possible sources of unplanned releases and sources of potential contamination caused by past practices.
	7.2 A process is in place to assess and mitigate significant risks and impacts to human health and the environment (including natural resources) associated with operations, emissions, releases and wastes.
	7.3 A property-transfer process is in place to identify and manage potential safety, health or environmental liabilities before transaction. The process shall include: • assessment of risk for identified liabilities • management of risks based on current and likely future uses of the property and potential changes in applicable law
	7.4 A process is in place to evaluate external waste management sites before use.
Element 8 – Product Stewardship *Manage potential risks of our products throughout*	8.1 A process is in place to maintain and communicate information on potential hazards and exposures from products from conception and development through acquisition, manufacture, distribution, storage, use,

Operational Excellence Element	OE Expectation
the product's life-cycles.	recycling, potential releases and disposal.
	8.2 A product risk assessment process is in place to identify and manage significant risks across the life-cycle of each product, by-product, intermediate or process. Process should ensure periodic re-evaluation as appropriate.
	8.3 A process is in place to identify and consider safety, health, environmental and product integrity impacts of manufacturing, distribution, storage, use, recycling, potential release and disposal when developing, formulating or improving products, by-products, process intermediates and processes early in the life-cycle.
	8.4 A system is in place to evaluate and manage risks posed through handling, transportation and distribution of company products, materials and other commercial goods. Implement appropriate risk-reduction measures.
	8.5 Promote product stewardship practices with third parties, including distributors, customers and other direct product recipients.
Element 9 – Incident Investigation *Investigate and identify root causes of incidents to reduce or eliminate systematic causes to prevent future incidents.*	9.1 A process is in place to report, record and investigate incidents and near misses and correct any deficiencies found. This process shall include: • management roles and responsibilities in incident investigation • root-cause analysis for significant events and near misses • periodic evaluation of incident cause trends to determine where improvements in systems, processes, practices or procedures are warranted • sharing of relevant lessons learned • procedures for follow-up and closure of actions taken to resolve deficiencies
Element 10 – Community Awareness and Outreach *Reach out to the community and engage in open dialogue to build trust.*	10.1 Foster on-going communication with employees, contractors, regulatory authorities and communities to address security, safety, health, environmental and other concerns related to operations, facilities, and products.
	10.2 A process is in place to familiarize interested parties with the facility, its operations and products, as well as efforts to protect safety, health and the environment.
Element 11 – Emergency Management *Prevention is the first priority, but be prepared for an emergency and mitigate any incident quickly and effectively.*	11.1 Respond immediately and responsibly to all emergencies involving Chevron wholly-owned or operated assets. For company products or interests such as common carriers, chartered vessels and facilities operated by others, monitor the response and, if warranted, take appropriate actions.
	11.2 Maintain an emergency response plan that describes how emergencies will be managed. Plans should address risks identified from site-specific risk and impact assessments including those conducted for Safe Operations and Environmental Stewardship.
	11.3 Facility emergency response plans shall be documented, accessible and clearly communicated. Plans shall: • be readily available to all on-site personnel • establish training and drill programs to annually test the emergency response plan and train the emergency response team • communicate the emergency response plan to employees, on-site contractors, joint-venture partners and appropriate government agencies • be integrated with relevant crisis management plans
	11.4 Develop and implement a business recovery plan to describe how critical business operations will be restored after an emergency incident to ensure employee well-being, regulatory compliance, revenue streams and

Operational Excellence Element	OE Expectation
	restoration of Chevron's reputation.
	11.5 Encourage affiliates, subsidiaries, joint ventures and other operating partners to adopt practices consistent with expectations for Emergency Management.
Element 12 – Compliance Assurance *Verify conformance with company policy and governmental regulations. Ensure that employees and contractors understand their safety, health and environmental responsibilities.*	12.1 A process is in place to identify all applicable laws, regulations, compliance requirements and policies. Ensure that all employees and contractors understand and comply with identified requirements.
	12.2 A self-audit process is in place to ensure compliance with all company policies and standards and with the spirit and letter of all applicable laws and regulations, regardless of the degree of enforcement.
	12.3 A process is in place that encourages employees and contractors to freely report existing or potential violations of law or company policy, without fear of retribution or any adverse company action because of his or her report. Processes must include an appropriate and timely investigation to address the report. Allowance must be made for anonymous reporting.
Element 13 – Legislative and Regulatory Advocacy *Work ethically and constructively to influence proposed laws and regulations and debate emerging issues.*	13.1 A process is in place to identify, track, and comment on proposed legislation, regulations, and emerging policy issues.

Appendix B.

A comparison of the ISO 14001 requirements ("shall" statements) with the Chevron Operational Excellence Management System. The content of the comparison is from the core components of the OEMS and its empowering corporate policy Number 530 Health, Environment & Safety. Sources – the Chevron Operational Excellence Management System: An Overview of the OEMS; Chevron Policy 530 – Health, Environment & Safety; and ISO 14001:2004. Direct quotes are italicized.

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
4.1 General requirements	The organization shall establish, document, implement and continually improve an environmental management system in accordance with the standard	Chevron Policy 530, OEMS	Strong linkage between policy and OEMS	G
	The organization shall define and document the scope of the system.	Vision& Values, OEMS Objectives	Three General Sections of OEMS – Leadership Accountability, Management System Process, OE Elements	G
4.2 Environmental policy	The policy shall: be appropriate to the nature and risks of the business; includes a commitment to continual improvement and prevention of pollution; includes a commitment to comply with applicable legal and other related requirements; provides a framework for setting and reviewing environmental objectives and targets; is documented, implemented and maintained; is communicated to all working for the organization; and is available to the public.	Chevron Policy 530. OEMS, MSP	When combined with the OEMS brochure, all requirements of this Standard Section are met *Leadership at all levels will foster a culture for HES excellence by assuring alignment of vision, expectations, and behavior drivers, including accountability. Systematic management of HES matters is required to achieve and sustain excellence in all of our operations.* *Pollution Prevention – Continually improve our processes to minimize pollution and waste.* Policy 530 is not accessible on external website Last revision Oct. 2001 Vision and Objectives – *An OE vision is established and specific objectives and measures for success are identified and cascaded to the workforce. Develop an OE vision, world-class objectives, metrics and targets. These are based on corporate objectives, benchmarking data and other critical business drivers.*	S
4.3 Planning				

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
4.3.1 Environmental aspects	The organization must establish, implement and maintain procedures to identify environmental aspects over which it has influence and determine which aspects have significant impacts on the environment.	LA, OEE#7, OEE#5	Personal Involvement in MSP – *Leaders prioritize OE plans to focus on the highest-impact items in alignment with vision and objectives. They provide resources and monitor progress until a successful conclusion is reached. Ensure that gaps are prioritized based on risk. Identify highest impact items for focus and inclusion in 3-year business plans.* Environmental Stewardship - *Strive to continually improve environmental performance and reduce impacts from our operations.* 7.1 *A process is in place to inventory all emissions, releases and wastes and to identify natural resources impacted by operations. (Natural resources include air, surface water, ground water, soil and geologic resources, and local biological diversity.) The inventory should include possible sources of unplanned releases and sources of potential contamination caused by past practices.* Reliability and Efficiency – Efficiency - *Maximize efficiency of operations and conserve natural resources.* 5.8 *A process is in place to track and improve energy efficiency while reducing emissions (including greenhouse gases) per unit of production.*	S
	The organization must keep this information up to date	MSP	Assessment – *A comprehensive evaluation is completed to identify gaps in OE processes and performance against established objectives. The frequency of the assessments should be based upon risks and business need. A full assessment is required at least every three years.*	S
	Must ensure that significant environmental impacts are accounted for in the management system	OEE#2, OEE#7 & OEE#8	Facilities Design and Construction - *Design and construct facilities to prevent injury, illness and incidents and to operate reliably, efficiently and in an environmentally sound manner.* 2.3 *A process is in place to comprehensively assess safety,*	G

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			health and environmental risks and impacts for new and modified facilities and develop plans to mitigate significant risks and impacts. Assessments conducted in early project phases shall be re-evaluated during final detailed design to ensure identified risks and impacts are mitigated as part of ongoing operations. Environmental Stewardship - *Strive to continually improve environmental performance and reduce impacts from our operations.* 7.2 *A process is in place to assess and mitigate significant risks and impacts to human health and the environment (including natural resources) associated with operations, emissions, releases and wastes.* Product Stewardship - *Manage potential risks of our products throughout the product's life-cycles.* 8.1 *A process is in place to maintain and communicate information on potential hazards and exposures from products from conception and development through acquisition, manufacture, distribution, storage, use, recycling, potential releases and disposal.* 8.2 *A product risk assessment process is in place to identify and manage significant risks across the life-cycle of each product, by-product, intermediate or process. Process should ensure periodic re-evaluation as appropriate.* 8.3 *A process is in place to identify and consider safety, health, environmental and product integrity impacts of manufacturing, distribution, storage, use, recycling, potential release and disposal when developing, formulating or improving products, by-products, process intermediates and processes early in the life-cycle.* 8.4 *A system is in place to evaluate and manage risks posed through handling, transportation and distribution of*	

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			company products, materials and other commercial goods. Implement appropriate risk-reduction measures.	
4.3.2 Legal and other requirements	The organization must identify applicable legal and other requirements to determine how they apply to the environmental aspects. The organization must ensure through the management system that these legal and other requirements are taken into account.	OEE#12. OEE#13	Compliance Assurance - *Verify conformance with company policy and governmental regulations. Ensure that employees and contractors understand their safety, health and environmental responsibilities.* 12.1 *A process is in place to identify all applicable laws, regulations, compliance requirements and policies. Ensure that all employees and contractors understand and comply with identified requirements.* 12.2 *A self-audit process is in place to ensure compliance with all company policies and standards and with the spirit and letter of all applicable laws and regulations, regardless of the degree of enforcement.* Legislative and Regulatory Advocacy - *Work ethically and constructively to influence proposed laws and regulations and debate emerging issues.* 13.1 *A process is in place to identify, track, and comment on proposed legislation, regulations, and emerging policy issues.*	S
4.3.3 Objectives, targets and programs	The organization is required to set up environmental objectives, targets and programs.	OE Objectives, LA, MSP	Objectives – *To better describe "world-class", the following corporate OE Objectives have been established. We will systematically manage OE in order to:* • *Achieve and injury-free work place.* • *Eliminate spills and environmental incidents. Identify and mitigate key environmental risks.* • *Promote a healthy workplace and mitigate significant health risks.* • *Operate incident-free with industry-leading asset reliability.* • *Maximize the efficient use of resources and assets.*	G

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			Alignment around OE Objectives – *Leaders establish a vision, widely communicated world-class objectives, metrics and targets for their units.* Vision and Objectives – *An OE vision is established and specific objectives and measures for success are identified and cascaded to the workforce. Develop an OE vision, world-class objectives, metrics and targets. These are based on corporate objectives, benchmarking data and other critical business drivers. Set objectives for OEMS implementation and the development of processes to meet OEMS requirements.*	
	These targets shall be measurable, consistent with their policy, include commitments to pollution prevention, compliance with legal and other requirements and require continual improvement.	PA	Continual Improvement – *utilizes measures and verification results and other input to evaluate how to improve the process and ensures actions are taken to improve process design and effectiveness.*	S
	The organization shall take into account legal and other requirements and its significant environmental aspect.	OEE#12	12.1 *A process is in place to identify all applicable laws, regulations, compliance requirements and policies. Ensure that all employees and contractors understand and comply with identified requirements.*	S
	The organization shall also consider technological options, financial, operations and business requirements and the views of interested parties	MSP	Implementation – *Contacts are maintained with OE networks to share lessons learned and to seek out best practices and processes that can be adopted to achieve plan objectives.* Review – *Identify possible plan adjustments based on emerging issues and changing business conditions. Consider results of external reviews.*	S
	Programs established to achieve targets and objectives shall designate responsibility at relevant functions and level of the organization and the means and time-frame by which they are to be achieved.	Chevron Policy 530, MSP, PA	Responsibility – *The Vice President, Health, Environment and Safety, will: Direct the development of strategies, management systems, processes, programs, standards, guidelines, and certain standard operating procedures, to ensure effective implementation of this policy.* Other key	S

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			assignments are made to: General Manager Policy, Planning & Performance for effectiveness of systems; Vice President & General Counsel for legal advice and strategy for compliance; President Energy Technology Company for technical advice and resources; Vice President Public Affairs for public/government relations strategies and communications; line management for complying with the policy and communications w/ employees; and employees for their behaviors. Management System Process – *MSP is a systematic approach used to drive progress toward world-class performance. The MSP is linked to the business planning process, and begins with defining a vision of success and setting objectives. Gaps between current performance and these objectives are uncovered during the assessment phase, then plans are developed to close the gaps, the plan is implemented and a review of plan implementation and performance is completed.* Review – *Annual review of all OEMS activity is conducted to evaluate progress on performance and identify necessary adjustments to plans to achieve world-class results. Review OE plan items to ensure they are effective and progress is on track to achieve world-class performance.* Resources, Roles & Responsibilities – *defines who is responsible to do the work, administer and maintain the process (Process Ownership).*	
4.4 Implementation and operation				
4.4.1 Resources, roles, responsibility and authority	Organization management shall ensure the availability of resources to establish and maintain the environmental management system.	LA	Leadership Accountability – *The largest single factor for success in operational excellence is leadership. Leaders are accountable not only for getting results, but getting results in the right way, behaving in accordance with our values. Leaders*	S

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			direct the MSP to drive improvement in OE results. Leaders at every level are also expected to foster a culture grounded in operational excellence. Alignment around OE Objectives – Leaders *ensure that the OEMS is implemented and processes are put in place to satisfy all OE Expectations and that resources, roles, responsibilities and accountabilities are fully aligned throughout the organization.* Personal Involvement in MSP - *Leaders prioritize OE plans to focus on the highest-impact items in alignment with vision and objectives. They provide resources and monitor progress until a successful conclusion is reached.*	
	Roles, responsibilities and authorities shall be defined, documented, and communicated in order to facilitate environmental management.	Chevron Policy 530, PA	530 - key assignments are made to: General Manager Policy, Planning & Performance for effectiveness of systems; Vice President & General Counsel for legal advice and strategy for compliance; President Energy Technology Company for technical advice and resources; Vice President Public Affairs for public/government relations strategies and communications; line management for complying with the policy and communications w/ employees; and employees for their behaviors. Resources, Roles & Responsibilities – *defines who is responsible to do the work, administer and maintain the process (Process Ownership).*	S
	Top management shall appoint a specific management representative.	Chevron Policy 530	Assigns responsibilities for the OEMS to the Vice President Health, Environment and Safety.	S
	Who shall ensure the environmental management system is in accordance with the Standard and this position is to report to the top management on the performance of the system and recommendations for improvement.	Chevron Policy 530, MSP	See duty of VP HES above Review – *An annual review of all OEMS activity is conducted to evaluate progress on performance and identify necessary adjustments to plans to achieve world-class results. Review OE plan items to ensure they are effective and progress is*	S

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			on track to achieve world-class performance. Evaluate the organizations MSP activity for improvement. Identify and manage new, unplanned actions not included in current business plans. Consider the results of external reviews.	
4.4.2 Competence, training and awareness	The organization shall ensure that persons performing tasks which can cause significant environmental impacts are competent in training, education or experience.	LA	OE Culture Through Workforce Engagement – Leaders *continuously improve our OE culture by understanding the gaps and removing barriers to world-class performance. Ensure that the entire workforce understands and expects that every job and every task can be completed every day without incident.*	S
	Records of competence shall be retained.	OEE#3, OEE#4, LA	Safe Operations - *Operate and maintain facilities to prevent injuries, illness and incidents.* 3.5 *A training program is in place to ensure that employees have the skills and knowledge to perform their jobs competently, in an incident-free manner and in compliance with all applicable laws, regulations, company policies, and requirements. The program shall include:* • *Identification of training needs for leaders, supervisors and other employees* • *Initial, ongoing and regular refresher training* • *Documentation and assessment of training effectiveness* 3.6 *A job-selection process is in place to fill defined HES-sensitive jobs. This process shall ensure that individuals selected have the knowledge, skills, performance history, abilities, and demonstrated behaviors to conduct their activities in an incident-free manner, in compliance with applicable laws, regulations, company policies and requirements.* Management of Change - *Manage both permanent and temporary changes to prevent*	LTS
	Training needs based on environmental aspects and the system shall be identified.			S
	Training or other action shall be taken to meet the needs			S

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
	Records shall be retained.		*incidents.* 4.1 *A process is in place to manage changes to facilities, operations, products or the organization. The management of change process shall address:* • *Both permanent and temporary change* • *Training* Visible Leadership Engagement and Commitment – *Ensure that the entire workforce understands and expects that every task can be completed every day without injury or incident.* Retention of records is not specifically addressed in the OEMS. The system merely require "documentation" of training.	LTS
	Workers shall be aware of the importance of conforming to the environmental policy and management system, the impacts associated with their work on significant environmental aspects, their role in achieving conformity with requirements of the management system, and the consequences of departure from specified procedures.			S
4.4.3 Communication	Communication regarding environmental aspects and the management system shall be maintained for internal levels and functions of the organization A procedure for receiving, documenting and responding to relevant external communications is required.	LA, MSP, OEE#3, OEE#8, OEE#10	Alignment around OE Objectives - *Leaders establish a vision, widely communicated world-class objectives, metrics and targets for their units. Widely communicate the performance objectives, metrics and targets to every level.* Planning – *A three-year plan is developed to manage the prioritized gaps. Plans are incorporated directly into business plans and accountabilities are assigned. Communicate metrics, targets and action plans.* Safe Operations - *Operate and maintain facilities to prevent injuries, illness and incidents.* 3.2 *A hazardous materials communication (HAZCOM) program to manage and communicate hazards* Product Stewardship - *Manage potential risks of our products throughout the product's life-cycles.* 8.1 *A process is in place to maintain and communicated information on potential hazards*	S

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			and exposures from products from conception and development through acquisition, manufacture, distribution, storage, use, recycling, potential releases and disposal. 8.5 *Promote product stewardship practices with third parties, including distributors, customers and other direct product recipients.* Community Awareness and Outreach - *Reach out to the community and engage in open dialogue to build trust.* 10.1 *Foster on-going communication with employees, contractors, regulatory authorities and communities to address security, safety, health, environmental and other concerns related to operations, facilities, and products.* 10.2 *A process is in place to familiarize interested parties with the facility, its operations and products, as well as efforts to protect safety, health and the environment.*	
	The organization shall decide whether to communicate externally about its significant environmental aspect It shall document its decision. Should the decision be to communicate, a method shall be established for external communications.	OEE#10	Community Awareness and Outreach - *Reach out to the community and engage in open dialogue to build trust.* 10.1 *Foster on-going communication with employees, contractors, regulatory authorities and communities to address security, safety, health, environmental and other concerns related to operations, facilities, and products.* 10.2 *A process is in place to familiarize interested parties with the facility, its operations and products, as well as efforts to protect safety, health and the environment.*	S
4.4.4 Documentation	Documentation of the environmental management system shall include: the policy, objectives and targets; description of the scope of the system; description of the main elements of the system and how they interact; document required by the ISO Standard; and documents determined by the organization to be necessary to manage processes related to significant environmental aspects.	Chevron Policy 530, OEMS Brochure, OEE#3, OEE#5	The policy and brochure are over-arching documents fully satisfy this requirement. Safe Operations - *Operate and maintain facilities to prevent injuries, illness and incidents.* 3.4 *A process is in place to ensure that operating and maintenance procedures, process safety information and other information are developed and maintained. The process shall ensure that*	G

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			documents, procedures, records and other information are current and accessible. Procedures for document control including confidentiality and retention shall also be included. Reliability and Efficiency – Reliability - *Operate and maintain facilities to sustain mechanical integrity and prevent incidents.* 5.4 *A documented program for condition monitoring (time-based inspection and testing) is in place to monitor and ensure mechanical integrity of all critical structures, equipment and protection devices.*	
4.4.5 Control of documents	Documents required by the system shall be controlled.	OEE#3, OEE#4	Safe Operations - *Operate and maintain facilities to prevent injuries, illness and incidents.* 3.4 *A process is in place to ensure that operating and maintenance procedures, process safety information and other information are developed and maintained. The process shall ensure that documents, procedures, records and other information are current and accessible. Procedures for document control including confidentiality and retention shall also be included.* Management of Change - *Manage both permanent and temporary changes to prevent incidents.* 4.1 *A process is in place to manage changes to facilities, operations, products or the organization.*	S
	Records shall be controlled in accordance with Standard subsection 4.5.4.		OEMS does not broadly address records identification, storage, protection, retrieval, retention and disposal in all areas of the system. It is also weak in direction on legibility, identifiability and traceability. Some guidance is given only in the safety and MOC expectations, but these should be broader and embrace records generated for all processes. No clear distinction between records and document. These details are probably left to local control.	LTS (see 4.5.4)

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
	Procedures shall be in place to: approve documents prior to issue; review, update and re-approve documents; ensure that changes and revision status are identified; relevant versions are available at the points of use; documents are legible and identifiable; pertinent external documents required by the system are identified and controlled; and obsolete documents are identified and protected from unintentional use.		Some of this level of control is lacking in system brochure and probably left to units and operations – particularly controlling and tracking changes in documents & destruction of obsolete documents	LTS
4.4.6 Operational control	The Organization shall identify and plan operations identified with significant environmental aspects in line with the environmental policy, objectives and targets to ensure they are carried out under specified conditions by: establishing procedures where the absence of procedures could lead to deviations from the policy objectives and targets; stipulating operational criteria in the procedures; and establishing procedures related to significant environmental aspects of goods and services used by the organization and communicating these to suppliers and contractors.	MSP, OEE#3, OEE#5, OEE#7, OEE#8, LA	Assessment – *A comprehensive evaluation is completed to identify gaps in OE processes and performance against established objectives. The frequency of the assessments should be based upon risks and business need. A full assessment is required at least every three years. Facility risks and capability to achieve world-class performance. Identify future risks that could prevent world-class performance.* Safe Operations - *Operate and maintain facilities to prevent injuries, illness and incidents.* 3.4 *A process is in place to ensure that operating and maintenance procedures, process safety information and other information are developed and maintained. The process shall ensure that documents, procedures, records and other information are current and accessible. Procedures for document control including confidentiality and retention shall also be included.* Reliability and Efficiency – Reliability - *Operate and maintain facilities to sustain mechanical integrity and prevent incidents.* 5.3 *A process is in place to establish and use a standardized set of equipment operations and surveillance duties and readings for all critical structures, equipment and protection devices to ensure they operate*	S

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			properly. Standardized work process indicators shall be established for identified critical work processes to ensure they are carried out effectively. 5.5 *A process is in place to plan, schedule and complete necessary maintenance for all structures, equipment and protective devices.* Environmental Stewardship - *Strive to continually improve environmental performance and reduce impacts from our operations.* 7.2 *A process is in place to assess and mitigate significant risks and impacts to human health and the environment (including natural resources) associated with operations, emissions, releases and wastes.* Product Stewardship - *Manage potential risks of our products throughout the product's life-cycles.* 8.1 *A process is in place to maintain and communicate information on potential hazards and exposures from products from conception and development through acquisition, manufacture, distribution, storage, use, recycling, potential releases and disposal.* 8.2 *A product risk assessment process is in place to identify and manage significant risks across the life-cycle of each product, by-product, intermediate or process. Process should ensure periodic re-evaluation as appropriate.* 8.3 *A process is in place to identify and consider safety, health, environmental and product integrity impacts of manufacturing, distribution, storage, use, recycling, potential release and disposal when developing, formulating or improving products, by-products, process intermediates and processes early in the life-cycle.* 8.4 *A system is in place to evaluate and manage risks posed through handling, transportation and distribution of*	

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			company products, materials and other commercial goods. Implement appropriate risk-reduction measures. 8.5 *Promote product stewardship practices with third parties, including distributors, customers and other direct product recipients.* Visible Leadership Engagement and Commitment – include all contractors within the "workforce". *Ensure that the entire workforce understands and expects that every job and every task can be completed every day without injury or incident.*	
4.4.7 Emergency preparedness and response	The organization shall have procedures to identify potential emergency situations and potential accidents and how it will respond to them.	OEE#11	Emergency Management - *Prevention is the first priority, but be prepared for an emergency and mitigate any incident quickly and effectively.* 11.1 *Respond immediately and responsibly to all emergencies involving Chevron wholly-owned or operated assets. For company products or interests such as common carriers, chartered vessels and facilities operated by others, monitor the response and, if warranted, take appropriate actions.* 11.2 *Maintain an emergency response plan that describes how emergencies will be managed. Plans should address risks identified from site-specific risk and impact assessments including those conducted for Safe Operations and Environmental Stewardship.* 11.3 *Facility emergency response plans shall be documented, accessible and clearly communicated. Plans shall:* • *be readily available to all on-site personnel* • *establish training and drill programs to annually test the emergency response plan and train the emergency response team* • *communicate the emergency response plan to employees, on-site contractors,*	G
	The organization shall respond to actual emergency situations and prevent or mitigate associated adverse environmental impacts.			G
	The emergency preparedness and response procedures shall be periodically reviewed and appropriately revised, particularly after actual incidents.			G
	Emergency preparedness and response procedures shall be periodically tested where practicable.			G

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			joint-venture partners and appropriate government agencies • *be integrated with relevant crisis management plans.* 11.4 *Develop and implement a business recovery plan to describe how critical business operations will be restored after an emergency incident to ensure employee well-being, regulatory compliance, revenue streams and restoration of Chevron's reputation.*	
4.5 Checking				
4.5.1 Monitoring and measurement	Requires the organization to have procedures to regularly monitor and measure the key characteristics of its operations that have a significant environmental impact.	MSP	Management System Process – *MSP is a systematic approach used to drive progress toward world-class performance. The MSP is linked to the business planning process, and begins with defining a vision of success and setting objectives. Gaps between current performance and these objectives are uncovered during the assessment phase, then plans are developed to close the gaps, the plan is implemented and a review of plan implementation and performance is completed.*	S
	The procedures shall include documenting information to monitor performance, operational controls and conformity with targets.	MSP	Vision and Objectives – *An OE vision is established and specific objectives and measures for success are identified and cascaded to the workforce. These are based on the corporate objectives, benchmarking data and other critical business drivers.* Assessment – *A comprehensive evaluation is completed to identify gaps in OE processes and performance against established objectives.* Review – *An annual review of all OEMS activity is conducted to evaluate progress on performance and identify necessary adjustments to plans to achieve world-class results.*	S
	The organization shall ensure good monitoring data quality and shall maintain records.		OEMS brochure does not address data quality or their records	LTS

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
4.5.2 Evaluation of compliance	It is required that the organization has procedures to periodically evaluate compliance with applicable legal requirements And shall maintain records of the compliance review. A procedure is required to evaluate compliance with other requirements to which they subscribe Shall keep records of the periodic evaluations.	OEE#12	Compliance Assurance - *Verify conformance with company policy and governmental regulations. Ensure that employees and contractors understand their safety, health and environmental responsibilities.* 12.1 *A process is in place to identify all applicable laws, regulations, compliance requirements and policies. Ensure that all employees and contractors understand and comply with identified requirements.* 12.2 *A self-audit process is in place to ensure compliance with all company policies and standards and with the spirit and letter of all applicable laws and regulations, regardless of the degree of enforcement.*	S
4.5.3 Nonconformity, corrective action and preventive action	The organization shall have procedures for dealing with actual or potential nonconformities, including correcting and preventing other occurrences.	OEE#9, OEE#12, LA	Incident Investigation - *Investigate and identify root causes of incidents to reduce or eliminate systematic causes to prevent future incidents.* 9.1 *A process is in place to report, record and investigate incidents and near misses and correct any deficiencies found. This process shall include:* • *management roles and responsibilities in incident investigation* • *root-cause analysis for significant events and near misses* • *periodic evaluation of incident cause trends to determine where improvements in systems, processes, practices or procedures are warranted* • *sharing of relevant lessons learned* • *procedures for follow-up and closure of actions taken to resolve deficiencies* Compliance Assurance - *Verify conformance with company policy and governmental regulations. Ensure that employees and contractors understand their safety, health and environmental responsibilities.*	S
	The procedure shall include: identifying and correcting nonconformities and mitigating environmental impacts; investigating these nonconformities to determine causes; evaluating actions to prevent nonconformities and implementing actions to prevent occurrences; recording results of corrective and preventive actions; and reviewing the effectiveness of corrective and preventive actions.			S
	All actions shall be appropriate to the scale of problems and environmental impacts.			S
	The management system shall be amended as necessary based on these actions.			S

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			Visible Leadership Engagement and Commitment – *Actively follow through on incident investigations to ensure root causes are determined and mitigating actions are carried out.* The system does not address nor define nonconformities or incidents	
4.5.4 Control of records	The requirement for maintaining records in accordance with the environmental management system and the standard.	OEE#3, OEE#4	Safe Operations - *Operate and maintain facilities to prevent injuries, illness and incidents.* 3.4 *A process is in place to ensure that operating and maintenance procedures, process safety information and other information are developed and maintained. The process shall ensure that documents, procedures, records and other information are current and accessible. Procedures for document control including confidentiality and retention shall also be included.* Management of Change - *Manage both permanent and temporary changes to prevent incidents.* 4.1 *A process is in place to manage changes to facilities, operations, products or the organization.* OEMS does not broadly address records identification, storage, protection, retrieval, retention and disposal all areas of the system. It is also weak in direction on legibility, identifiability and traceability. Some guidance is given only in the safety and MOC expectations, but these should be broader and embrace records generated to all processes. No clear distinction between records and document. These details are probably left to local control.	S
	There must be a procedure for identification, storage, protection, retrieval, retention and disposal of records.			LTS
	Records must remain legible, identifiable and traceable.			LTS
4.5.5 Internal audit	The organization shall, at planned intervals, conduct internal audits of the environmental management system to assess conformance to	LA, MSP	Personal Involvement in MSP – *Leaders personally direct the MSP for continuous OE improvement and integrate operational excellence*	S

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	the standard, is implemented and maintained, and report the findings to management.		*into business plans. They provide resources and monitor progress on OE plans until a successful conclusion is reached. Review the effectiveness of OE plans, processes, OEMS implementation and revise plans as necessary.* Visible Leadership Engagement and Commitment – *Leaders visibly demonstrate involvement and commitment to improve OE performance. They understand their roles, responsibilities and accountabilities as owners of operational excellence and seek to continually improve their personal and their organization's capabilities to achieve world-class OE performance. Actively engage in improvement of their personal and their organization's OE capability. Engage third parties to ensure alignment around OE Expectations.* Review – *An annual review of all OEMS activity is conducted to evaluate progress on performance and identify necessary adjustments to plans to achieve world-class results. Review OE plan items to ensure they are effective and progress is on track to achieve world-class performance. Evaluate the organization's MSP activity for improvement. Identify possible plan adjustments based on emerging issues and changing business conditions. Identify and manage new, unplanned actions not included in current business plans. Consider results of external reviews. External reviews include peer assists as well as corporate reviews conducted every 3 to 5 years.*	
	The audit program shall take into account the environmental importance of the operations and result of past audits.			S
	The audit procedure shall address scope and frequency of audits, the responsibilities and requirements for conducting audits, reporting results and retaining records.			S
	The audit process and auditors shall be objective and impartial.	Corporate OE Review Process	*The Corporate OE Review Process plays an integral part in OEMS implementation. The process provides independent feedback to operations on good practices and gaps in OE systems, processes and activities.* OE Review teams are staffed with knowledgeable professionals from outside the unit being	S

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			reviewed. *OE Reviews provide an excellent learning opportunity to accelerate the understanding and performance of the OEMS within business units.*	
4.6 Management review	The Standard requires review of the environmental management system by top management at planned intervals.	MSP, Corporate OE Review Process, OEE#12	Review – *An annual review of all OEMS activity is conducted to evaluate progress on performance and identify necessary adjustments to plans to achieve world-class results. Review OE plan items to ensure they are effective and progress is on track to achieve world-class performance. Evaluate the organization's MSP activity for improvement. Identify possible plan adjustments based on emerging issues and changing business conditions. Identify and manage new, unplanned actions not included in current business plans. Consider results of external reviews. External reviews include peer assists as well as Corporate reviews conducted every 3 to 5 years.* *The Corporate OE Review Process plays an integral part in OEMS implementation. The process provides independent feedback to operations on good practices and gaps in OE systems, processes and activities. It also updates executive management on the status of OEMS implementation around the corporation.* Compliance Assurance - *Verify conformance with company policy and governmental regulations. Ensure that employees and contractors understand their safety, health and environmental responsibilities.*12.1 *A process is in place to identify all applicable laws, regulations, compliance requirements and policies. Ensure that all employees and contractors understand and comply with identified requirements.* 12.2 *A self-audit process is in place to ensure compliance with all company policies and*	S
	The reviews shall assess needed improvements and changes to the system.			S
	Records of the management reviews must be retained.			S
	Management reviews shall include input on: results of internal audits and reviews of legal and other requirement; external communications and complaints; environmental performance measures; review of objectives and targets; status of corrective and preventive actions; results of prior management reviews; changing legal or other requirements; and suggestions for improvements.			S
	Outputs from the management reviews shall include decisions and actions consistent with commitment to continuous improvement.			S

ISO 14001:2004 Standard Section	ISO 14001:2004 Requirement Statement	OEMS Applicable Feature	System Content & Comments	Assessment of OEMS Conformance with Standard
			standards and with the spirit and letter of all applicable laws and regulations, regardless of the degree of enforcement. Regarding the retention of records of management reviews, the OEMS is silent on this point, but is undoubtedly being addressed in the course of executive meeting minutes. Reconciling the requirement to include input from external communications and complaints is taken from the "Review" portion of the MSP that takes into account emerging business issues and changing business conditions. Ideally, this would include law suits, shareholder initiatives, NGO concerns that come to the attention of leadership.	

- Good - the OEMS exceeds the requirements of the ISO 14001 standard or provides a high degree of assurance of alignment
- Satisfactory - areas where the OEMS gives assurance of meeting the standard but may have areas of weakness or concern
- Less Than Satisfactory - areas where the OEMS does not provide reasonable assurance of conformity with the ISO 14001 standard

Abbreviations:
LA – Leadership Accountability – the portion of the OEMS Overview dealing with Leadership Accountability
MSP – Management System Process – the iterative cycle of setting a Vision & Objective, Assessment, Planning, Implementation and Review
OEE – Operational Excellence Expectation – Any of forty-six expectations organized within thirteen elements of the OEMS that frame the corporate-wide requirement for processes in place to manage safety, health, environment, reliability and efficiency.
PA – The Process Approach the five-component model that frames each OE Process or procedure to ensure it meets an OE Objective. Components include: Purpose, Scope & Objectives; Procedures; Resources, Roles & Responsibilities; Measurement & Verification; and Continual Improvement

Appendix C.

Comparison of the Elements and Expectations of the ExxonMobil Operational Integrity Management System with correlative components of the Chevron Operational Excellence Management System. Grey shaded areas indicate areas where alignment between the content of the OIMS and OEMS brochure are minimal or lacking.

ExxonMobil OIMS Element and Principle	ExxonMobil OIMS Expectations	Correlative Chevron OEMS Content	Comment on OEMS & Expectation Content
Element 1 – Management Leadership, Commitment and Accountability *Management establishes policy, provides perspective, sets expectations and provides the resources for successful operations. Assurance of Operations Integrity requires management leadership and commitment visible to the organization, and accountability at all levels.*	1.1 Systems for Operations Integrity management are established, communicated and supported at every level in the organization.	Chevron Policy 530, OEMS Brochure, LA	
	1.2 Managers visibly demonstrate commitment and personal accountability for Operations Integrity, promote an open and trusting environment, and understand how their behaviors impact others. Commitment is demonstrated through active and visible participation.	LA	Visible Leadership Engagement and Commitment
	1.3 Supervisors knowledge and skills are developed to effectively apply Operations Integrity management tools and systems.	LA	Visible Leadership Engagement and Commitment
	1.4 Management establishes the scope, priority and pace for System implementation and improvement, considering the complexity and risks involved with their operations and products.	OEMS Brochure	
	1.5 Roles, responsibilities, authorities and accountabilities within the System are known and exercised.	LA, PA	LA-Alignment Around OE Objectives PA-five-component model
	1.6 Clear goals and objectives are established for the System, and performance is evaluated against these goals and objectives.	MSP, LA	MSP-Vision & Objectives LA-Alignment Around OE Objectives
	1.7 Expectations are translated into procedures and practices.	MSP, PA	Vision & Objectives, Assessment PA – five-component model
	1.8 The workforce actively participates in the Operations Integrity process, and relevant learnings are shared across the organization.	LA	Build an OE Culture Through Workforce Engagement
	1.9 Performance is evaluated, and the degree to which expectations are met is assessed. The results are stewarded to corporate management.	MSP, Corporate OE Review	Assessment
	1.10 Managers responsible for businesses Operated by Others (OBO) communicate OIMS principles to the Operator and encourage the adoption of OIMS or similar systems.		No OEMS correlative
Element 2 – Risk Assessment and Management *Comprehensive risk assessments can reduce safety, health, environmental and security risks and mitigate the*	2.1 Risk is managed by identifying hazards, assessing consequences and probabilities, and evaluating and implementing prevention and mitigation measures.	MSP	Assessment
	2.2 Risk assessments are conducted for ongoing operations, for projects and for products in order to identify and address potential	OEE#1, OEE#2,	Expectations: 1.2, 2.3, 3.1, 5.2, 7.2, 7.3, 8.2, 8.4, 11.2

ExxonMobil OIMS Element and Principle	ExxonMobil OIMS Expectations	Correlative Chevron OEMS Content	Comment on OEMS & Expectation Content
consequences of incidents by providing essential information for decision-making.	hazards to personnel, facilities, the public and the environment.	OEE#3, OEE#5, OEE#7, OEE#8, OEE#11	
	2.3 Periodic risk assessments are performed by qualifies personnel, including expertise from outside the immediate unit, as appropriate.		Details not specified in OEMS
	2.4 Risk assessments are updated at specified intervals and as changes occur.		Details not specified in OEMS
	2.5 Assessed risks are addressed by specified levels of management appropriate to the nature and magnitude of the risk, and decisions are clearly documented.		Details not specified in OEMS
	2.6 A follow-up process is in place to ensure that risk-management decisions are implemented.		Details not specified in OEMS
Element 3 – Facilities Design and Construction *Inherent safety and security can be enhanced, and risk to health and the environment minimized, by using sound standards, procedures and management systems for facility design, construction and startup activities.*	3.1 Project management procedures are documented, well understood and executed by qualified personnel.	OEE#2	2.1-CPDEP Standardized process
	3.2 Criteria are established and procedures are in place for conducting and documenting risk assessments at specific project stages to ensure that Operations Integrity objectives are met.	OEE#2, OEE#3	2.1-CPDEP Standardized process 3.1
	3.3 The design and construction of new or modified facilities use approved design practices and standards that: • Meet or exceed applicable regulatory requirements • Embody responsible requirements where regulations do not exist • Address other important considerations, including security and Human Factors	OEE#2, OEE#3	2.1-CPDEP Standardized process 3.1
	3.4 Deviation from approved design practices and standards, or from the approved design, is permitted only after review and approval by the designated authority, and after the rationale for the decision is documented.	OEE#2	Details not specified in OEMS, covered in CPDEP Standardized Process in Decision Review Board
	3.5 Quality–assurance processes are in place, which ensure that facilities and materials received meet design specifications and that construction is in accordance with applicable standards.	OEE#2	2.2-Operations Assurance
	3.6 A pre-startup review is performed and documented to confirm that: • Construction is in accordance with specifications • Operations Integrity measures are in place • Emergency, operations and maintenance procedures are in place and adequate	OEE#2	2.2-Operations Assurance, 2.4

ExxonMobil OIMS Element and Principle	ExxonMobil OIMS Expectations	Correlative Chevron OEMS Content	Comment on OEMS & Expectation Content
	• Risk-management recommendations have been addressed and required actions taken • Training of personnel has been accomplished • Regulatory and permit requirements are met		
Element 4 – Information/Documentation *Accurate information on the configuration and capabilities of processes and facilities, properties of products and materials handled, potential Operations Integrity hazards and regulatory requirement is essential to assess and manage risk.*	4.1 Drawings and other pertinent documentation necessary for sound operation and maintenance of facilities are identified, accessible, accurate and appropriately safeguarded.	OEE#3	3.4
	4.2 Information on the potential hazards of materials involved in operations is kept current.	OEE#3	3.2 -HAZCOM
	4.3 Information on the potential hazards associated with products, and guidance to enable proper handling, use and disposal, are documented and communicated.	OEE#8	8.1
	4.4 Information on applicable laws and regulations, licenses, permits, codes, standards and practices is documented and kept current.	OEE#12	12.1
	4.5 Pertinent records covering operations, maintenance, inspections and facility changes are maintained.	OEE#4	4.1-Management of Change
Element 5 – Personnel and Training *Control of operations depends upon people. Achieving Operations Integrity requires the appropriate screening, careful selection and placement, ongoing assessment and proper training of employees, and the implementation of appropriate personnel safety and occupational health programs.*	5.1 A process is in place for screening, selection, placement and ongoing assessment of the qualifications and abilities of employees to meet specific job requirements.	OEE#3	Safe Operations 3.5
	5.2 Criteria are in place to ensure that necessary levels of individual and collective experience and knowledge are maintained and are carefully considered when personnel changes are made.	OEE#3, OEE#4	3.6 – job-selection process 4.1- MOC training
	5.3 Initial, ongoing and periodic refresher training is provided to meet job and legal requirements and to ensure understanding of the proper protective measures to mitigate potential Operations Integrity hazards. This training includes: • Assessment of employee knowledge and skills relative to requirement • Training documentation • Assessment of training effectiveness	OEE#3	3.5 and 3.6
	5.4 The assessment and documentation of, and feedback on, employee performance address Operations Integrity elements.		No OEMS correlative
	5.5 A process for the management of personnel safety, including security-related considerations, is in place. It is expected that: • employees and contractors consistently recognize and proactively mitigate operational, procedural and physical hazards • employees and contractors proactively and routinely identify	OEE#3, LA	3.2, 3.5 LA – Visible Leadership Engagement and Committement

ExxonMobil OIMS Element and Principle	ExxonMobil OIMS Expectations	Correlative Chevron OEMS Content	Comment on OEMS & Expectation Content
	and eliminate their unsafe behaviors and those of their co-workers • Human Factors are addressed • Behaviors, unsafe conditions and other precursors that can lead to incidents are recorded, analyzed and addressed		
	5.6 A process for the management of occupational health is in place. Based upon assessed risk to personnel, exposures are monitored, proper protective and preventive measures are implemented, early detection and diagnosis are provided, and pertinent health data is recorded and reviewed.	OEE#3	3.3-Occupational health program
Element 6 – Operations and Maintenance *Operation of facilities within established parameters and according to regulations is essential. Doing so requires effective procedures, structured inspection and maintenance programs, reliable Operations Integrity critical equipment, and qualified personnel who consistently execute these procedures and practices.*	6.1 Operating, maintenance and inspection procedures are developed and implemented. These procedures include Human Factors considerations and are updated at specified intervals and when changes are made.	OEE#5	Reliability-5.1, 5.2, 5.3, 5.4, 5.5, 5.6
	6.2 A work permit process incorporated checks and authorizations that are consistent with mechanical and operational risks.	OEE#3	3.2-permitting, lock-out/tag-out, etc.
	6.3 Critical alarm, control, shutdown, security and emergency-response equipment is identified and tested, and it undergoes preventive maintenance.	OEE#5	Reliability-5.3, 5.4, 5.5
	6.4 The temporary disarming or deactivation of critical alarms, control, shutdown, security and emergency-response equipment is managed.		Details not specified in OEMS
	6.5 Operations with potentially higher risk are managed with special procedures.	OEE#5	5.3
	6.6 Interfaces between operations are assessed, and procedures are in place to manage identified risks.		Details not specified in OEMS
	6.7 Environmental aspects are addressed and controlled, consistent with policy, regulatory requirements and business plans. They include the tracking of emissions, discharges and wastes.	OEE#5, OEE#7	Efficiency-5.8 & 5.9 Environmental Stewardship-7.1
	6.8 Applicable laws, regulations, permits and other governmental requirements are met, and the resulting operating requirements are documented and communicated to those affected. Compliance is periodically verified.	OEE#12	Compliance Assurance
	6.9 Proper long-term shutdown or abandonment of facilities is planned and managed.	OEE#2, OEE#7	2.4 & 7.3-Property transfer (not quite analogous)
	6.10 Quality-assurance processes are in place, ensuring that facilities and materials received meet designated specifications.		
Element 7 – Management of Change *Changes in operations,*	7.1 A process is in place for the management of both temporary and permanent changes.	OEE#4	4.1

ExxonMobil OIMS Element and Principle	ExxonMobil OIMS Expectations	Correlative Chevron OEMS Content	Comment on OEMS & Expectation Content
procedures, site standards, facilities or personnel must be evaluated and managed to ensure that Operations Integrity risks arising from these changes remain at an acceptable level.	7.2 The process for managing changes addresses: • Authority for approval of changes • Analysis of Operations Integrity implications • Compliance with regulations and approved standards • Acquisition of needed permits • Documentation, including reason for change • Communication of risks associated with the change and required mitigation measures • Time limitations • Training	OEE#4	4.1 Details not covered in OEMS are: • Analysis of Operations Integrity implications • Compliance with regulations and approved standards • Acquisition of needed permits • Time limitations
	7.3 Temporary changes do not exceed initial authorization for scope or time without review and approval.		Details not specified in OEMS
Element 8 – Third-Party Services *Third parties doing work on the company's behalf impact its operations and its reputation. It is essential that they perform in a manner that is consistent and compatible with ExxonMobil's policies and business objectives.*	8.1 Third-party services are evaluated and selected using criteria that include an assessment of compatibilities to perform work in a safe and environmentally sound manner.	OEE#6	6.2
	8.2 Third-party performance requirements are defined and communicated. They include: • responsibility for providing personnel appropriately screened, trained, qualified and able to perform specified duties • a process for self-monitoring and stewardship	OEE#6	6.2
	8.3 Interfaces between organizations providing and receiving services are effectively managed	OEE#6	6.2
	8.4 Third-party performance is monitored and assessed, feedback is provided, and deficiencies are corrected.	OEE#6	6.2
Element 9 – Incident Investigation and Analysis *Effective incident investigation, reporting and follow-up are necessary to achieve Operations Integrity. They provide the opportunity to learn from reported incidents and to use the information to take corrective action and prevent recurrence.*	9.1 A process is in place for reporting, investigating, analyzing and documenting actual safety, health, environmental and regulatory-compliance incidents and significant near misses.	OEE#9	9.1
	9.2 Procedures exist for the Law Department to investigate, analyze and advise on incidents when necessary.		Legal Department role not defined in OEMS
	9.3 Procedures exist for actual incidents and near misses, other than those investigated by the Law Department, which: • provide for timely investigation • identify root causes and contributing factors • determine actions needed to reduce risk of this incident and related incidents • ensure that appropriate legal action is taken and documented	OEE#9	9.1

ExxonMobil OIMS Element and Principle	ExxonMobil OIMS Expectations	Correlative Chevron OEMS Content	Comment on OEMS & Expectation Content
	• reflect legal input		
	9.4 Findings are retained, periodically analyzed to determine where improvements to practices, standards, procedures or management systems are warranted, and used as a basis for improvement.	OEE#9	9.1
	9.5 A process is in place to share lessons learned from actual incidents and near misses among ExxonMobil organizations, and to interact with others as appropriate to facilitate improvements in performance.	OEE#9	9.1
Element 10 – Community Awareness and Emergency Preparedness *Community awareness is a key factor in maintaining public confidence in the integrity of our operations. Emergency planning and preparedness are essential to ensure that, in the event of an incident, all necessary actions are taken for the protection of the public, the environment and company personnel and assets.*	10.1 Community expectations and concerns about operations, including those of the workforce, are recognized and addressed in a timely manner.	OEE#10	10.1
	10.2 Emergency-preparedness and response plans are documented, accessible and clearly communicated. The plans, based on assessed Operations Integrity risks, include: • organizational structure, responsibilities and authorities • internal and external communications procedures • procedures for accessing personnel and equipment resources • procedures for assessing essential Operations Integrity information • procedures for interfacing with other ExxonMobil and external emergency response organizations • process for periodic updates	OEE#11	11.2, 11.3
	10.3 Equipment, facilities and trained personnel needed for emergency response are defined and readily available.	OEE#11	11.2
	10.4 Simulations and drills are periodically conducted, which include consideration of external communications and involvement.	OEE#11	11.3
Element 11 – Operations Integrity Assessment and Improvement *Assessment of the degree to which expectations are met is essential to improve Operations Integrity and maintain accountability.*	11.1 Operations are assessed at predetermined frequencies to establish the degree to which the Operations Integrity expectations are met.	MSP, Corp OE Reviews	Review
	11.2 The frequency and scope of assessment reflect the complexity of the operation, level of risk and performance history.	MSP, Corp OE Reviews	Review
	11.3 Assessments are conducted by multidisciplinary teams, including expertise from outside the immediate unit.	MSP, Corp OE Reviews	Review & peer assists
	11.4 Findings from assessments are resolved and documented.	MSP, Corp OE Reviews	Review
	11.5 The effectiveness of the assessment process is reviewed periodically, and findings are used to make improvements.	MSP, Corp OE Reviews	Review

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